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VIEWS, NEWS AND INTERVIEWS.

Mr. Robert Garrett, ex-president of the Baltimore & Ohio Railroad Company, who died at Deer Park, Md., on July 29, had some interesting experiences in the early days of the telegraph business. He was an incorporator of the American Union Telegraph Company, which was eventually sold to the Western Union when the Vanderbilt interests were retired and Jay Gould became the controlling power in the telegraph business of the country. When he became president of the Baltimore & Ohio in 1884, he endeavored to combine under his management a telegraph system and express and parlor and sleeping car services. These proved to be expensive adjuncts, and, along with other experiments, cost the Baltimore & Ohio treasury millions of dollars. In 1887, while Mr. Garrett was in Europe selling $10,000,000 of the railroad's bonds, the Baltimore & Ohio telegraph system was sold to the Western Union. Mr. Garrett at once resigned the presidency of the Baltimore & Ohio, and, acting under advice of his physicians, started on a tour around the world, accompanied by a number of relatives and friends. It is said that one of the great ambitions of Mr. Garrett's life was to bring Jay Gould, and thus the Western Union Telegraph Company, to terms, and to establish a rival system.

Chicago has 270 miles of electric railway in operation, and many more in process of construction.

An eight-inch iron pipe one-quarter-inch thick, with flanges electrically welded on, when tested to destruction at Lloyd's Proving House, Netherton, England, according to an exchange, broke in the body of the pipe at 88 tons, the welded part remaining intact, and a similar pipe of steel broke in the welded part of the flange at over 101 tons. These tests were tensile only, and were carried out with the view of proving the absolute soundness and consequent strength of the flanges electrically welded on.

Mr. Mark A. Hanna will make good use of the telephone during the campaign. He will spend alternate weeks at Republican headquarters in New York and the headquarters in Chicago, and when he is at his home in Cleveland he will be in constant communication with both headquarters by telephone.

Uncle Rube—Say, don't electric cars kill people pretty often 'round here?

Slopsy—Naw; only oncet.—*Up-to-Date.*

It is reported that a brewing company at Montgomery, Ala., has ordered a number of electric wagons to be used in delivering beer. The first instance on record of electricity having anything to do with delivering beer occurred in Brooklyn, N. Y., about two years ago, when an ambitious trolley car tried to help along a brewery wagon. By means of the trolley car's help the beer was delivered for about two blocks in all directions.

A Wall street broker gives a new version of the meaning of 16 to 1. He says that if the free silver men win, 16 men will be looking for one job.

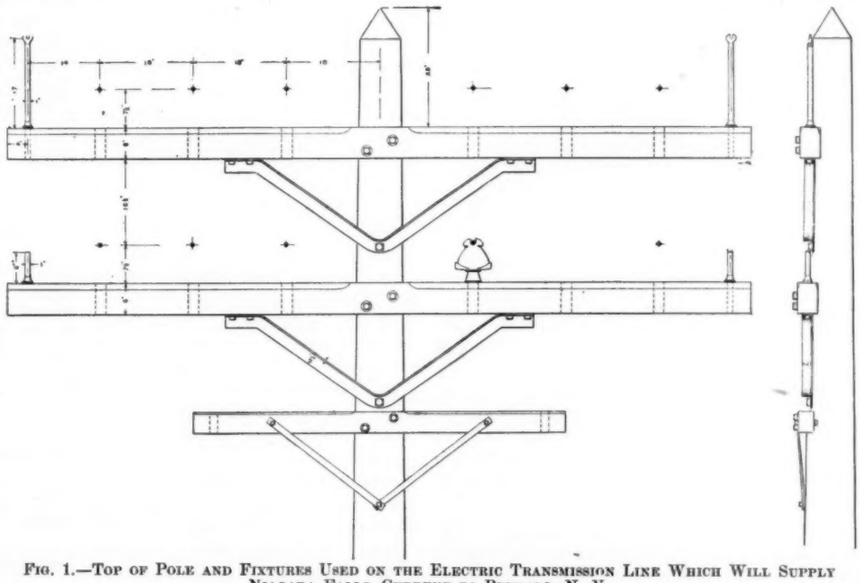


Fig. 1.—Top of Pole and Fixtures Used on the Electric Transmission Line Which Will Supply Niagara Falls Current to Buffalo, N. Y.

At Bellaire, Mich., there is published a paper called *X-Rays*. It is devoted to reform in general.

Bids for Two Electric Light Plants Wanted.

The Department of the Interior, through the Office of Indian Affairs, is inviting proposals until August 18, for furnishing and erecting complete electric light plants at Pine Ridge Agency, S. D., and at Roseland Agency. Prospective bidders may obtain additional particulars by addressing Hon. D. M. Browning, Commissioner of Indian Affairs, Washington, D. C.

THE TRANSMISSION OF ELECTRIC POWER FROM NIAGARA FALLS TO BUFFALO.

IN NOVEMBER NEXT THE FIRST POWER WILL BE TRANSMITTED AND WILL BE USED BY THE BUFFALO RAILWAY COMPANY—A TRANSMISSION LINE OF UNUSUAL IMPORTANCE—AN EXAMPLE OF FINE ENGINEERING.

For some time past there have been rumors that electric power was soon to be transmitted from the plant of the Niagara Falls Power Company, at Niagara Falls, N. Y., to be used in Buffalo, N. Y. It took some time to secure the proper right of way, and as the work involved was of an original and novel character, considerable time and thought was devoted to the consideration of the best means for carrying the current. A few weeks ago the Cataract Construction Company made a contract with the White-Crosby company, of 29 Broadway, New York city, for the complete design and construction of the transmission line. An unusual amount of special designing has been required, and this the White-Crosby company has carried out with its well known engineering ability and thoroughness. Mr. J. G. White has devoted his personal attention to the matter, and his efficient corps of assistants has rendered him worthy aid. Work will be commenced at once, and, when finished, the line will have cost in the neighborhood of $500,000. This is one of the most important electrical engineering contracts ever begun, and the reputation of the firm which has it in charge assures its success.

The accompanying drawings will

give a very good idea of the appearance of one of the poles and its fixtures used in the line and of the special type of insulator employed. The poles are of round cedar, shaved and painted, with 9 and 10-inch tops. The length will vary from 35 to 50 feet, depending on the soil and the requirements of the line. The cross-arms are of hard, yellow pine, 4 inches by 6 inches by 12 feet, dressed, chamfered and painted. The short arm, shown in Fig. 1, is a standard six-pin electric light arm bored for two pins. This cross-arm will carry a private telephone line from the power house at Niagara Falls to the transformer station in the city of Buffalo. The cross-arm braces have been specially designed and possess several points of novelty. They are made of two and one-half by one-quarter inch angle iron, formed hot and bored for lag screws. The angles weigh about 20 pounds apiece and are primarily designed to act as trusses. As will be seen in the drawing, the bearing surfaces are on the under side of the cross-arm. The cross-arms are gained into the poles and are fastened with two lag screws staggered.

The pins shown on the extremities of the lower, long cross-arm are steel guards to prevent any of the conductors from falling in case a tie wire, pin or insulator breaks. The long steel pins on the top cross-arm are for a similar purpose and also to carry the galvanized iron barbed fence wire, which will be used as a lightning conductor. Another conductor of the same kind will be carried on top of the poles. At every fifth pole these lightning conductors are grounded to a coil of wire buried at the foot of the pole.

Each conductor of the transmission line is of 350,000 circular mils stranded bare copper wire. When the line is completed there will be 12 of these conductors. Each pole will then carry a weight of 1,200 pounds of copper. The mechanical strains to which the pole and lines may be subjected have been calculated with the greatest nicety. These calculations have been carried to the extent of assuming the whole line to be covered with one-half inch of ice.

This transmission line will run over a private right of way from the Niagara Falls Power Company's station at Niagara Falls to Tonawanda, and thence down one bank of the Erie Canal to Buffalo. The entire line will be fenced in.

The induction effects will be overcome by a transposition of the conductors from pole to pole. The phase of this transposition is such that the entire line is shifted on five poles.

The insulator to be used on the lines is, as will be seen from Fig. 2, of a special and novel design. It is made of porcelain, and so proportioned as to protect all weak points. Uniform strength and a large insulating surface have been assured. Along the lower edge of the outside petticoat is a gutter, designed to drain away water on each side clear of the cross-arm. The construction of the insulator and gutter is such that icicles are compelled to form at only two points, both clear of the cross-arm.

The total capacity of the transmission line will be 20,000 horse-power. The current will be three-phase alternating, and each half of each of the long cross-arms will support three wires, carrying 5,000 horse-power. The contract calls for the completion of this line by November 15, but the White-Crosby company expect to be able to deliver 5,000 horse-power of current in Buffalo on or before November 1. The arrangements have all been made, by which the Buffalo Railway Company will take the first 1,000 horse-power delivered in the city.

The transmission line is being built by the White-Crosby company for the Cataract Construction Company. When it is completed the latter company will turn it over to the Niagara Falls Power Company, whose final property it becomes.

The Niagara Falls Power Company

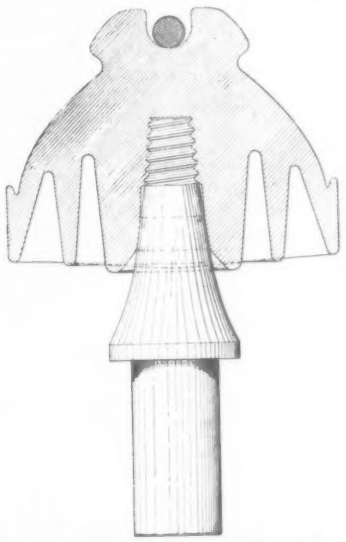


Fig. 2.—Special Type of Porcelain Insulator Used on Niagara Falls-Buffalo Transmission Line.

will generate the current at the Falls and send it over the line to the city limits of Buffalo. It will here be delivered to a sub-company of the Niagara Falls Power Company, known as the Cataract Power and Conduit Company. The latter is the distributing company in Buffalo. Its president is Mr. George Urban, Jr., and Mr. Charles R. Huntley is its vice-president and general manager. The capital of the company is $2,000,000, and its board of directors is as follows: E. D. Adams, John Jacob Astor, D. O. Mills, Daniel O'Day, William B. Rankine, Francis L. Stetson and Edward L. Wickes, of New York, and Charles R. Huntley and George Urban, Jr., of Buffalo.

OBITUARY.

John J. Hogan, inventor of the Hogan boiler, died at Middletown, N. Y., on July 30, of Bright's disease. He was born in Ireland and was educated in Dublin and Belgium. His mechanical talents led Sir William Fairchild to apprentice him to the Reading Iron Works, near London, paying a fee of £300 therefor. He lived for a while in New York and St. Louis before establishing his boiler works at Middletown.

Thawing Out Oil Wells by Electricity.

[From the Philadelphia Times]

The result of a useful invention, which is just about to be placed on the market, will be to create a new era in the history of oil and to start fresh life into the regions which have flourished in the past, but are now regarded as played out. It will turn the desert regions of the oil sections into bustling towns and will furnish an enormous supply of petroleum that would be sufficient of itself to do the work of the greater part of the world. The dead wells will become as fountains and the springs of the deep will give up their wealth in an inexhaustible quantity.

This invention is the work of a Washington gentleman, Mr. Tapley W. Young, and consists of an electric heater, which can be lowered into the well. The electricity is generated in large quantities and so powerful is the heat that the refuse matter, which clogs the pores of the stone, will be melted and run out, thus allowing the fresh upward flow of oil.

To understand the principles upon which this invention is founded, it will be necessary to explain that the theories as to exhaustion of so many wells is that the oil, in passing upward through the stone, has clogged the porous stone with paraffin in such quantities that the further flow is stopped and the well ceases to produce. Some think that it is because the supply in the earth has given out, but the generally accepted idea is that the oil is still in abundance and only ceases to flow when the exit is stopped.

The stone through which the oil passes is of a very porous nature and, as the liquid is in a crude state, the thick matter becomes as dregs, settling in the rock near the edges of the bottom of the well. It has been common to use torpedoes to shatter the stone at the bottom of the well, thus breaking up the clogged matter, but this is an expensive process.

By the Young method the machine, which is about three feet long and resembles an iron cartridge, is placed at the bottom of the well, and the electricity turned on so powerfully that it receives just enough volts to produce an enormous heat without melting the metal. The current goes down the wires and by the peculiar construction of the carbon-packed chambers the intense heat is radiated about into the rock in all directions. Thus the paraffin and other refuse is softened and melted up so that it runs, and when the well is started a fresh flow takes place just as strong as it did when the well was first sunk. This rejuvenating of the dry wells of the oil districts of the United States means a great deal of money to the people of Pennsylvania, New York, Kentucky and Indiana. Many a man who has lost his fortune in the drying of his well will be again able to pump dozens of barrels, hundreds of wells will spring into new life, thousands of dollars will be made from what is now worthless property and millions of barrels of oil will be added to the annual production of the country.

The invention made by Mr. Young is in the hands of the Standard Oil Company and will be thoroughly tested. As that company owns so much oil land, the machine will be a source of the saving of great wealth to them, as well as to the many hundreds of people all over these districts in New York and Pennsylvania.

Shipping American Product to Germany and Austria.

The Brown Hoisting and Conveying Machine Company, of Cleveland, Ohio, have just received an order from Fried Krupp, at Essen, Germany, for a complete hoisting and conveying plant for their blast furnace at Rheinhausen.

This plant consists of three standard Brown overhead bridge tramways, to be operated by electricity, each machine having independent winding drums and electric motors. The Brown company are to furnish all the working parts, including the sheaves, engines, motors, hoisting and conveying machines, etc., in fact, everything but the bridges proper, which will be built in Germany, the Brown company sending a man abroad for that purpose. There will be three Elwell-Parker motors used of about 60 horse-power each. The entire machine is to be in operation during the early part of 1897.

The company has also sold to the Krainesche Industrie Geselschaft, of Austria, three of Brown's patent overhead tramways, driven by independent Elwell-Parker electric motors of a nominal capacity of 60 horse-power.

It is quite a triumph for American engineers to receive these orders from the skilled countries of Europe. The Brown company and the Elwell-Parker Company are both to be congratulated.

Bell Telephone Output.

The instrument statement of the American Bell Telephone Company for the month ended July 20, 1896, shows: Gross output, 12,584, against 13,837 last year; returned, 10,490, against 7,513; net output, 2,094, against 6,324. Since December 20: Gross output, 126,678, against 98,896 last year; returned, 53,687, against 47,121; net output, 73,011, against 51,775; total outstanding, 749,547, against 634,283.

No American Money on Montreal Street Railways.

The Montreal Street Railway Company announced last week that after August 1 United States silver or nickels would not be accepted for payment of fares on its lines.

The Cincinnati Street Railway Company has purchased the Mount Adams and Eden Park railroad, and Mount Auburn cable road, assuming debts of both roads. Capital increased $7,000,000 to $18,000,000. This consolidates all the street railways in Cincinnati, excepting one small line, which is in the hands of a receiver and has other legal complications.

SHOULD COLLEGE PROFESSORS TAKE OUT PATENTS?

WHAT A PATENT ATTORNEY THINKS.

To the Editor of Electrical Review:

Another voice from a place where patents form a part of the very atmosphere—that is, a patent attorney's office—upon the above subject may not be an objectionable addition to the comment in your pages.

To one constantly in touch with the practical phases of the industrial arts, and also conversant with that debatable ground where theory enters the field of practice, there does not seem to be a single argument in favor of depriving the college professor of the benefits of the patent laws. Surely when those wonderfully wise men who formed that epitome of the freeman's law, "The Constitution," made provisions for the protection of the incorporeal property of inventions, they never dreamed that there would ever rise a false social standard by which one class of inventor should be branded and set apart for a manner of disenfranchisement. And, moreover, that these should be the ablest of men and most fitted for the work of invention, of aiding the wheels of progress.

The patent laws were designed to stimulate invention. Let them benefit every man. Only those who from personal motives so desire, should be permitted to evade their wise provisions.

And from an ethical standpoint, the philanthropic desire to benefit the public by renouncing the monopoly of a letters patent is erroneous. It fails more often than it succeeds, and in many cases the first inventor, by his failure either to publish his invention over the land or to patent it, only lives to see some one with a less amount of philanthropy, calmly reaping the benefits of a patent.

While on the face this seems a hardship to the public, what help is there for it? The Patent Office can not deny a patent, unless they have positive evidence of prior invention. A former patent, or a definite publication, accessible to the examiners, is a decisive anticipation.

The scientific man has almost without exception been responsible for inventions of a generic nature, practical and mechanical, for applied improvements. The two work hand in hand, and are mutually dependent for the production of great industrial advances.

Professor Stine's saying that "The reason that so large a percentage of patents are either worthless or faulty, is that the average inventor is so greatly lacking in scientific and mathematical knowledge," may perhaps not frown at a slight amendment from one who breathes "patent" air.

One reason why the majority of granted patents are worthless is, that attorneys encourage inventors to take out patents on anything and everything, trusting to luck to secure an infinitesimal *claim*, and hence a fee. To a large extent this is caused by the leaning of the average inventor to cheapness, to "no patent, no pay," thus driving the good old-fashioned, reliable attorney from the field. There is no such thing as a *cheap attorney* in patents. Neither do reliable attorneys run *prize* concerns nor grab-bag competitions. No man would care to have a quack lawyer carry out the commands of his will for the benefit of children he had loved in life. Why should he deliver the child of his intellect into the hands of a patent quack?

Again, there are numberless inventions, each but a minute atom in some

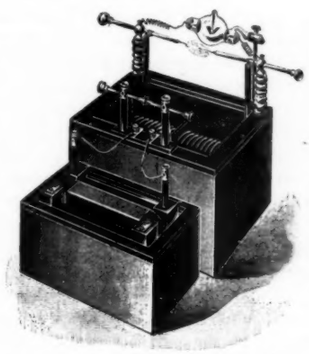


Fig. 1.—An English Form of Tesla Apparatus.

pronounced step of progress. Indeed, history has often shown that the tortoise of minute and apparently valueless invention has won the race as against the hare that would at once leap at results. Thus, years and years were spent by the most learned men in the attempt to perfect the telephone. They all ran too fast and stepped far over the mark. Again 10 years of persistent invention on the sewing machine produces the magnificent mechanism of to-day.

Giving due weight, however, to the force of the intellectual inventor in progress, as against the practical inventor, one can not but see that their proper relation is to move hand in hand. Moreover, the patent law throws its protecting cloak over all who may come thereunder, and none shall be denied.

Edward C. Weaver.

Washington, D. C., July 27.

KIND WORDS.

WILL CONTINUE TO READ THE "REVIEW."

To the Editor of Electrical Review:

The Electrical Review covers its field, and is very interesting and of considerable value to me, although not especially employed in electrical work or research. I will continue a subscriber.

W. W. Little, M. D.

July 27, 1896.

The Pittsfield, Mass., Electric Light Company recently held its annual meeting and declared a regular dividend of six per cent. The company will also increase its capital stock $25,000, making a total of $125,000. A number of improvements, including a new dynamo and boilers, have been added to the plant.

THE RIGHTS OF ELECTRICAL COMPANIES.

ABSTRACT OF A PAPER READ BEFORE THE NORTHWESTERN ELECTRICAL ASSOCIATION, MARINETTE, WIS., JULY 15, 1896, BY W. CLYDE JONES.

There are few electrical pursuits which do not require for their proper exercise the enjoyment of a public franchise, as the right to use the public streets or highways for the placing of their wires and conductors. The obtainment and enjoyment of such a franchise bring the electrical company into contact with the governing power of the community. Wires placed on the public ways without the consent of the governing power may be removed as a nuisance. Authority from the proper power must be secured, although the use may be a proper street use. All power for the granting of franchises lies primarily in the State, subject to the restrictions of the Federal constitution and lawful statutes of the United States. To the extent not restricted by the State constitution, also, the legislature has the power to grant the use of the street for a special purpose. The grants are usually made subject to control by the municipal authority as to the manner in which the franchise is to be exercised, as, for instance, the street upon which the franchise shall lie, the nature of the construction, and the like. In some cases the legislature delegates to the municipality the authority to grant as well as con-

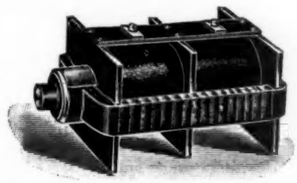


Fig. 2.—High-Tension Transformer.

trol the use of the public way for the special purpose.

But though the government may permit the company to exercise a franchise, the franchise can not be exercised in derogation of the rights of others without due compensation therefor, and this brings into consideration the much vexed question of the relation of the company to the abutting property owner.

Two theories exist as to the relation of the abutting property owner to the street. In some instances an easement or right of passage has been granted to the public while the ownership of the fee to the land over which the street extends remains in the abutting property owner, the property owners on each side of the street owning to the middle of the street. In other cases, the fee to the land over which the street passes remains in the public and the property owner acquires the property with the privileges of the street as to right of access and egress, light, air and comfort. The difference in view as to the relation of the property owner to the street has resulted in different conclusions by the courts as to whether a certain special use does or does not impose a new burden on the street such that the abutting property owner is entitled to compensation. Where the ownership of the land on which the street lies is in the public, a special use of the street has been held to be a proper use not imposing a new burden, while the same use has been held to impose a new burden where the ownership of the land to the middle of the street is in the abutting property owner. This distinction, however, as to the different relations of the abutting property owner to the street, has of late years been losing force, and the weight of authority of courts and text-book writers tends toward the obliteration of this distinction and toward the consideration of the subject solely with reference to the rights of the abutting property owner to the enjoyment of the street for ingress and egress, light, air and comfort, any special uses which materially affect these rights being additional burdens, requiring compensation to the property owner, while special uses not materially affecting these rights are proper uses without compensation.

This modern view relieves the inquiry of the legal subtleties and reduces the inquiry to a simple question of fact as to whether the new use does or does not effect the enjoyment of the street by the property owner, and, if so, to what extent?

An English Form of Tesla Apparatus for Radiography.

The accompanying illustrations show a form of Tesla apparatus which is being made by an English firm. The London *Electrical Review* describes this apparatus as follows:

Fig. 1 shows a complete Tesla apparatus, being patented by Mr. L. Miller, for obtaining high-tension oscillating discharges from the street electric light mains, where the current is alternating. The illustration is taken from a set of apparatus supplied to St. Bartholomew's Hospital for obtaining photographs of injured limbs, etc., by means of Roentgen rays. Messrs. Miller & Woods supply a standard set which gives a stream of sparks over more than a six-inch air gap. The set consists of a step-up transformer, Fig. 1, from 100 volts to about 6,000 volts, and taking the same current as two lamps of 16-candle-power each; a condenser, and a Tesla transformer to about 70,000 volts. The condenser discharges by rapid oscillations of current across the spark gap (shown in figure) through the primary thick wire winding of the Tesla coil. Induced currents are then set up in the inner thin wire secondary winding of the Tesla coil. These are led to the discharge rods and can be used to excite Roentgen rays in a single or double-focus tube as shown, or demonstrate the Tesla experiments. The boxes in which the above are contained are filled with mineral oil. Fig. 2 shows a high-tension transformer which can be used up to about 4,000 volts without oil. It is said to be a neat, compact form of transformer for exciting vacuum tubes, ozone generators, etc., and can readily be connected to the electric mains by means of a lamp-holder attached to a piece of flexible cord.

ELECTRICITY IN MINING.

BY F. B. PHELPS.

During the past five years, and particularly the last two and one-half, the use of electricity in the various departments of the mining industry has grown from small to substantial proportions. However, it has by no means reached as general use as in the transportation and lighting fields. This is largely due to the number of complicated problems that must be solved—many of them by practical tests. The mining industry, if stone quarrying be included, is carried on in every State in the Union. The marble quarries of Vermont, the great anthracite and bituminous coal fields of the Appalachian range, the coal and iron deposits of the South, the soft coal beds of Ohio, Indiana and Illinois, the iron mines of Wisconsin, Minnesota and Michigan, the metallic copper deposits of the Lake Superior region, the mineral and metal mines of South Dakota, and the entire Rocky Mountain region from the British possessions on the north to Mexico on the south, constitute one vast field in which electricity is destined to play an important economic part.

Mountainous regions, because of their inaccessibility, entailing expensive transportation, and the scarcity of fuel, are the most fertile fields for its application. There are to-day numerous instances where the current is generated at a natural waterfall and transmitted from 10 to 20 and even a greater number of miles, to heretofore inaccessible points, the total cost being little more than the interest on the plant investment the expense of supervision and repairs. If the same horse-power had been developed by coal, the cost would be so large as to be prohibitive. This transmission of power is by no means exclusively confined to mining. The General Electric has installed apparatus aggregating 100,000 horse-power, and it is probable that competitors have done as much or a little less in the aggregate. Two of the most recent plants that have been constructed, or are in process of completion, are the Mercur, in which 25,000 horse-power is transmitted 16 miles, and the Ogden-Utah transmission enterprise, undertaken on a still larger scale. The application of the current, whether generated by fall of water or by steam, to almost every mechanical branch of mining, is exceedingly easy. Therein lies one of its strongest claims for practicability. Whether it be for hoisting, underground work, channeling or lighting, the result is the same—and the more extensive its use, the cheaper it becomes. It is often difficult to reach portions of a mine with steam or air pipes. With electricity it is simply a matter of stringing wires. This permits the establishment of a battery of boilers and a generating plant in one place, supplying current for use in various parts of one mine or in a series of mines. This saves largely in the cost of fuel, and in condensation of steam or loss in efficiency of compressed air. An isolated electric hoisting plant, unless water be used as the primal power, would not be an economic success. But where a series of them are in use, at various points above and under ground, and where the locations are constantly changing, results are decidedly in favor of electricity, the efficiency running from 80 per cent up. The application of the current to a hoist was the first in the industry. Almost every conceivable type of a motor is now in use, and they number well into the thousands.

Underground haulage was the next application demonstrated to be practical. Motors are built with reference to the conditions under which they are forced to work. They are shown to have the advantage in compactness, simplicity, the small outlay for repairs and the general cheapness, as compared with steam. No figures are available, showing the difference in results of underground work in favor of electricity as against steam. However, the Westbrook Manufacturing Company, of Maine, which uses a motor on something less than a mile of surface track, and which does not figure cost of generation as it comes from water power, says that in one year the haulage expense was $1,258, as against $2,617 the year previous for steam haulage. There are something like 150 fully equipped motors in use under ground.

Underground pumping is carried on to advantage by electricity, especially where the pumps are far from the surface and when they are frequently shifted. The adoption of soft-coal cutters is now very general in the soft-coal fields of Pennsylvania, Ohio, Indiana and Tennessee. The anthracite mines have not taken up the use of electricity to any great extent.

Perhaps the nicest application, from a mechanical as well as a practical standpoint, is in prospecting or diamond drills. The very nature of this work necessitates almost constant shifting of locality, which, in the application of steam or air, entails heavy cost. The armature of the motor in the most improved type of machine is attached to the core shaft, so that the application is direct. Authorities disagree as to the practicability of electric motor rock drills. Some claim that they are practical, especially those of the latest type. Others that they are not. Perhaps the best success in this field has been scored by the Marvin company, of Syracuse. The question of generation enters largely into consideration in determining this problem. When the cost is the minimum, as from water power, there can be a great loss in efficiency without impairing the practability of the drill. Where coal is used the cost is very much greater, and in many cases prohibitive. Experiments have been carried on incessantly under all sorts of conditions, and the best evidence that the electric drill has not reached the standard of the hoists or motors, is the general lack of its use. The solenoid magnet is the most frequently employed. As is well known, this acts very well on light work, but in heavy work is said to be deficient. The uncertainty of the blow is one of the undesirable features. The same set of conditions does not apply to channelers, and they are being very generally adopted, especially in sandstone quarries.

The mining industry as a whole has been quiet, especially as regards developments, since the time that electricity was looked upon as a practical agent. For this reason its use has not been as general as would otherwise have been the case. Its great field is, of course, the mountainous West, which is full of waterfalls, and has mineral deposits which can not be made accessible except through cheap power. The plants now in operation are a stimulus to enterprise, and it is only a question of time before there will be power companies to furnish current to mining locations, much after the manner in which lighting currents are distributed in the cities. The operation of the Aspen, Colo., plant is a case in point. This is one of the most successful and best paying in the West.

The recent heavy sales of mining apparatus of American manufacture in South Africa and other foreign fields, who look to England as a basis of supplies, has caused considerable comment. It is explained on two grounds; viz., all the talent of the well equipped American plant is brought to bear upon a proposition; size, speed and efficiency are produced, and a standard established. This means better and cheaper apparatus, and, moreover, it means that it is kept on hand, so that duplicates and supply parts can be promptly had. In Europe no pains are taken to construct a machine to meet the changing needs of mining and to employ the latest type of apparatus. If five or ten pieces are constructed, they are regarded as a large quantity, and are not, as a rule, duplicated and kept in stock. Parts are also obtained with difficulty.

How Sandy Got Rid of His Surplus Electricity.

[*From the New York Sun.*]

The Scotch carpenter who undertakes odd jobs for neighbors in the suburb of Brooklyn, where he lives, had been cheerier than usual for a day or two. He was just finishing a stairway for a friend, when he unexpectedly remarked:

"Man A'm beginning tae feel rale fine."

"What's been the matter, Sandy?" he was asked. "Stomach?"

"Na, na," was the rejoinder. "Electreecity, that's what has been the maiter we me. Electreecity. Aye, man, A've had an awfu' time wi' masel. Ye ken three o' ma teeth were fulled wi' plateenum be' a dentist. The plateenum, it seems, formed an electric cirket, as they ca' it, throo ma nerves wi' the trooser button at the back o' ma breeks, an' wad ye believe it, it made me bodily an' physeecally a wreck. A've suffered the torments o' the damned, an' nae doctor could gie me ony relief. A jist had tae find the hale thing oot for maesel'. It came aboot in an extraordinar' wey."

"How was that, Sandy?" his auditor asked, impressed by the man's earnestness.

"Well, A was jist lyin' in ma bed, when A began to feel awfu'. A thocht A was gaun' tae dee. 'Get up, Jean,' A said tae ma wife. 'Get up, woman, an' gang for a doctor. A'm deein'.' 'Losh keep me, man,' says she, 'maybe yer only restless. Try anither bed.' Well, A went tae anither bed, an' as A lay there thinkin' it oot an' suffrin' awfu', A got an idee that came like an inspirashun. The bed A had jist left had springs that were covered wi' wudden slats. The bed A went tae had springs, tae, but thae were na' covered. Ma condeeshun in the second bed was worse than the first. A had an awfu' pain in ma stammach, an' waur than that, A felt fair parlyseed. Then A thocht o' ma teeth, an' the plateenum fullin'. It came tae me like a flash. 'It's electreecity that ails me,' A said tae maesel'. 'I'll no stay in bed anither minute.' So A got up, an' sat up a' nicht, In the mornin' A went tae see the doctor. A jist tell him a' aboot ma troubles. A tell im aboot the teeth an' the plateenum. 'Noo,' A said, 'A can proove it. Ye ken, Doctor, where a man's nerves are. Weel, when A felt this shock A jist traced the queer feelin' frae the nerves o' ma teeth, alang ma face, doon ma neck, an' syne intae ma kist, doon ma legs tae this wee nerve in ma fit. A pineted tae the very place, an', sure as daith, the Doctor said that A was richt; that the nerves jist went as A had pineted oot.

"'Weel,' says A tae him, 'what dae ye think? Dae ye think A should har thae teeth pooed oot?'

"'Yes,' says he. 'If ye think it wud dae ye ony guid, get them pooed oot.'

"Wi' that A went tae the dentist's roon the corner an' there A had anither sair trial. A telt ma case tae the man, an' he seemed kind o' dubious. 'A want a' thae plateenum fulled teeth taken oot,' says A tae him. 'Dinna fash yersel' aboot the expense. A'm tae pey the piper.' Wo' that A sat doon in the chair, when A got sitch a shock! It near drove me mad. A fund oot that the heed rest o' the bit chair was o' iron, or steel, or some ither conductor, and made anither connection wi' ma teeth. It near drove me crazy. At ma request the dentist pit a tooel ower the heed rest an' thus destroyed its conductin' poor. Then he yanked out thae teeth. Man, A hae comfort noo. A've had the wife tak' aff a' the metal buttons frae ma breeks, an' substitute yins o' bane. There's nae metal springs on the bed A sleep on noo, an' A'm baginnin' tae get back ma appetite. A tink A'll be as strong as ever sune. But nae mair metal fillin' in the teeth fur me."

GENERAL TELEPHONE NEWS.

RUNNING NOTES FROM A TRAVELING CORRESPONDENT.

The telephone situation in the sections of the country mentioned is well described by an observing correspondent, who has recently returned to New York. He says:

The independent field in Virginia, North Carolina and Tennessee shows great activity at the present time and in many places the competing companies are taxing the Bell interests and forcing them to greatly improve their plants. At Lynchburg, Va., the independents have a paying exchange of 450 subscribers. This company recently discarded the old plant and purchased an entirely new outfit and plan to give greatly improved service at a low rate. At Richmond a new plant of 1,015 subscribers is being installed and the projectors show considerable courage in going into a city of that size, where the Southern Bell is so well established with pushing men, who contest every step. The Inter-State Telephone Company at Durham, N. C., has 160 subscribers at that place, also exchanges at Winston, Goldsboro and Charlotteville, Va., and at Frederick, Md. They are also building an exchange at Wilmington, N. C. This company seems to be in the field to stay, and is on the outlook for new points at which to build. At Asheville, N. C., and at Knoxville, Tenn., the Bell people have strongly established companies. At the former place there is no opposition, but at the latter place the People's Telephone Company, with 600 subscribers, are making a strong fight, and apparently holding their own. At Chattanooga the Bell people have about 700 subscribers without opposition. At Nashville there is no opposition, though a movement is on foot for the organization of a new company. The Madison Telephone Company, Madison, Ind., has about 200 subscribers, and at Indianapolis the Bell people still hold the field without opposition. At Fort Wayne a new company is building an exchange with 1,000 subscribers; rates at $24 and $30.

The ruling rates in the independent companies are about $18 and $24, and wherever there is opposition the Bell people have met such rates, and in many places are considerably below them. At several points free service has been given by the established company in order to kill the opposition movement, but in most cases it has failed of its object.

A new exchange has been installed at Columbia City, Ind., by the Home Telephone Company, with 80 subscribers; rates, $12 and $24; metallic circuit to all subscribers.

The United Telephone Company is operating at Bluffton, Huntington and Portland; rates, $18 and $24. Operating successful exchanges, with perhaps 450 subscribers in the aggregate.

Citizens' Telephone Company, Decatur, Ind., has 100 subscribers.

Home Telephone Company, Wabash, Ind., has 200 subscribers.

Elkhart, Ind., has 270 subscribers.

At South Bend a new company, using the Stromburg-Carlson equipment, is starting with 500 or 600 subscribers, on metallic circuits with much underground work. Is on a solid basis.

Plymouth, Ind., has 140 subscribers.

Lafayette, Ind., has 625 subscribers.

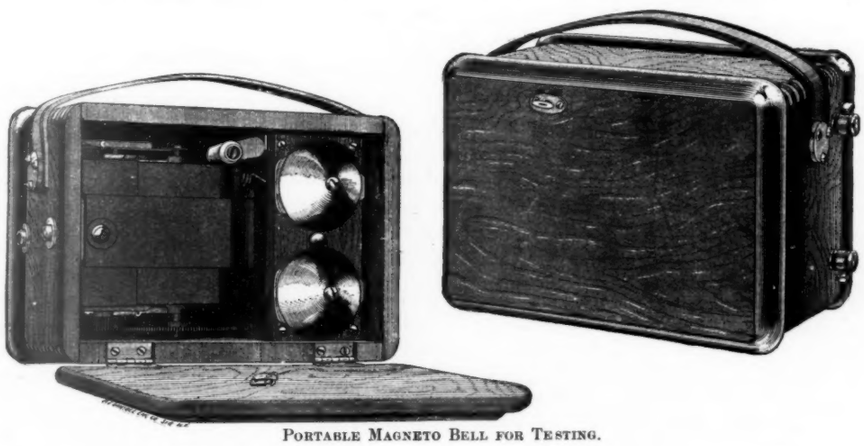
Crawfordsville, Ind., has about 300 subscribers.

Danville, Ind., has about 400 subscribers.

The construction, in most places, so far as the independent field is concerned, has been on the basis of an individual wire with a common return, and much trouble has arisen, owing to cross talk and generally poor construction. It seems to have been a general feeling among the inexperienced people, who have for the most part projected the independent business, that, after purchasing their central office outfit and telephones, the most important part of labor has been the former, and the line work and connection, together with plans for future extension, have been subordinated to the other apparatus. The result has been that small wire and poles with bar construction are frequently seen in these exchanges. It is fair to state, however, that almost universally this construction has been improved, and in some places entirely discarded, even though at a great loss. In many places plants are being constructed on a metallic-circuit basis.

It is more than likely that this construction, which is the only substantial method, will be demanded by the companies reorganizing and their subscribers as absolutely necessary and, while at the low ruling rates it may be possible to give such service with an individual wire for each subscriber, it is now possible to obtain such a device as will enable companies to place five or ten subscribers on a metallic circuit and give practically individual wire service.

In southwestern Missouri there are a number of companies who are spreading out from town to town, and who plan to cover the southern half of the State. A case in point is that of the Barry County Telephone Company, at Cassville, Mo., owned and managed by Messrs. Bayless and Mitchell. They have exchanges at two important points with several smaller exchanges tributary to them, and are financially able to branch out in any way they see fit. They have many miles of county lines and are increasing the mileage very materially this Summer.



PORTABLE MAGNETO BELL FOR TESTING.

Compliments from Abroad.

TO THE EDITOR OF ELECTRICAL REVIEW:

This morning I received the foreign papers, and take pleasure in sending you a quotation from *L'Electricien* of June 20, 1896, as follows:

"L'Electrical Review de New York, qui a toujours la primeur de tout ce que fait ou écrit Tesla, public un portrait de lui, d'après une photographic prise en deux secondes à la lumière d'un tube sans électrodes donnant environ 250 bougies."

"The ELECTRICAL REVIEW, of New York, which is always the first to publish Tesla's inventions or his memoirs, publishes a likeness of the inventor from a photograph taken in two seconds by the light of a tube without electrodes giving about 250 candle-power."

This is written by a "reader" of the *Electricien*, and proves that the ELECTRICAL REVIEW is thoroughly well known and appreciated by your French co-workers. The same gentleman continues as follows:

"Tesla has opened our vista to magnificent views. What a boundless horizon he discloses to our eyes in his elegant writings. Barring the lamentable accident to his laboratory about a year ago, he would have given us the knowledge of his new oscillator, which, according to the inventor's estimate, will be the best industrial generator of electricity. After the fire Tesla had to start again from the very beginning, but now the damage has been repaired and he announces that the oscillator is nearly finished."

Surely, this is both a high encomium for Tesla and for the sagacity of the editor of the ELECTRICAL REVIEW, and if it might not appear unbecoming in a person so little known to the outside world, I would venture to add that the French writer has hit the nail on the head. The very fact that Tesla selects the REVIEW as his medium of informing the electrical fraternity speaks volumes and weighs more than thousands of pounds of chromos, sent incessantly by some of your New York contemporaries. M. B.

Boston, July 25.

The Susquehanna, Pa., Electric Light, Heat and Power Company are about to issue $20,000 of six per cent bonds.

Portable Magneto Bell for Testing.

The Utica Fire Alarm Telegraph Company, 106, 107 and 108 Liberty street, Utica, N. Y., are the manufacturers of the portable magneto bell for testing, shown in the illustrations herewith. They are useful for testing the insulation of electric circuits, locating leaks in electric light and power generators and in annunciator bell and gas lighting systems. The bells are made with a capacity of ringing through various resistances, from 10,000 to 50,000 ohms, according to the purposes for which they are to be used. They are constructed with the same care as this company's well known magneto call and magneto extension bells and should find a ready market.

What Is the Standard up to Now?

The ELECTRICAL REVIEW, New York, had a recent article in its "Telephone News and Comment," in which it asks several pertinent questions about "The Standard Telephone Company." The REVIEW would do a service to its many readers and patrons, as well as to the general public, if it would follow up the operations of "The Standard," and tell the plain facts about them in its usual terse and honest way.—*The American, Philadelphia.*

"Electrical Review" Gives Trustworthy News.

[*From the Buffalo, N. Y., Courier.*]

The ELECTRICAL REVIEW has just completed its 28th volume. In addition to giving thoroughly trustworthy news of the progress of electrical work in all its branches, the ELECTRICAL REVIEW has secured, in the past six months, a large number of valuable and exclusive articles on important subjects. It printed the first official interview with Professor Roentgen, the only interview with Professor Salvioni, of the University of Perugia, Italy, who made some very interesting and remarkable discoveries on the Roentgen ray, and the first official interview with Thomas A. Edison on his new fluorescent lamp.

The Class Journal in Politics.

[*From the Indianapolis Journal.*]

A peculiarity of this presidential campaign is the unusual number of non-political papers which are coming out on the side of sound money. There is in the country, as many know, a class of papers devoted exclusively to business—sometimes to a particular line of business. Some of them are papers of high standing and wide circulation among the class for whom they are published, but as they circulate among persons of all parties they do not, as a rule, discuss politics. This year, however, is an exception. The money question having got into politics, they are discussing it from a business point of view, and all of them on the side of sound money. One would expect to find financial papers on this side of the question, yet they do not treat it as a party question.

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SPECIAL NOTICE TO ADVERTISERS.

***CHANGES** for advertisements must be in this office by Friday noon for the following week's issue.*

***NEW ADVERTISEMENTS** should be in the office not later than Saturday noon to insure publication the following week.*

NEW YORK, AUG. 5, 1896.

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The recent thunder-storms which have been prevalent in New York city and vicinity have caused considerable damage and have been much more frequent than usual. The vagaries and curious accidents typical of lightning strokes have afforded the sensational daily press unusual opportunities for scare headlines and columns of stories, in which a lack of knowledge of electrical phenomena has been fittingly displayed.

On the face of the new one-dollar silver certificates, just issued by the government, is a border of laurel wreaths, each containing the name of an eminent American. Prominent among these are the names of Franklin and Morse.

It is encouraging to note the constantly increasing tendency to high class engineering work in the electrical field. There is no denying that in past years electric light and railway plants were installed in a slovenly and unsatisfactory manner. Nearly all these examples of bad engineering have been done away with, and in their places we see plants designed on simple and practical lines, with due regard to present efficiency and future extensions. Improvements in the quality and efficiency of apparatus have also been remarkable in the last two years.

An interesting paragraph in our telephone news column in this issue of the ELECTRICAL REVIEW tells about a novel service introduced in San Francisco by the Pacific Telephone and Telegraph Company. The service is designed to prove to householders that a telephone is just as necessary to successful domestic economy as electric light or water. The service is known as "kitchen service;" that is, the telephone is placed in the kitchen, and may be used only for outward service, such as calling the butcher, grocer, physician, druggist or coal dealer. No arrangements are made for these telephones to be called up, hence the company is enabled to offer the service at an almost nominal price. Here is an example of enterprise that might well be followed by other telephone companies.

NIAGARA POWER.

The news contained in this issue of the ELECTRICAL REVIEW that the construction of the transmission line from Niagara Falls to Buffalo, N. Y., has actually begun, means that one of the most important electrical engineering contracts ever undertaken is under way. If this line proves to be the success it promises to be, a number of other lines will be immediately built, and cities farther away from Niagara Falls than Buffalo will receive the benefit of long-distance electric power. Rochester will probably be the next place to be served, and after that Albany is spoken of. The importance of this work can not be overestimated. The experience gained in building and operating the Buffalo line will be of the greatest value to engineers concerned with other electric transmission plants in all parts of the country.

PROVIDING FOR THE FUTURE.

An interesting difference exists between the engineering department and the management of most successful electrical companies. While the manager is endeavoring to keep things running at the highest efficiency, the engineer is planning ahead, sometimes years in advance, to provide the necessary plant to take care of the increase of business which is sure to come. Every now and then the engineer will make improvements or changes in the plant. All this must be done without hampering the manager in any way, or interfering with the steady operation of things. This state of affairs is especially true of telephone companies. If the proper extensions of lines and exchanges were not designed and provided for a long while ahead, there would come a time when the maximum capacity would be reached and the efficiency of the service would be sadly impaired. Electrical engineers are of necessity logical thinkers, and many are gifted with excellent foresight. An engineer of prophetic powers is worth much money to his employer.

THE INDEPENDENT TELEPHONE MOVEMENT.

Our news columns this week contain a number of paragraphs telling of the progress made by the independent telephone companies in various parts of the country. The whole independent field is in a transition state, and with a few exceptions the business of the companies has surpassed their most sanguine expectations, and in most places it has been difficult to keep up with orders, while at many points the plant has been constructed on a basis wholly inadequate to the demands of the increasing business. In many places the fight has been very sharp between the established and new companies, the Bell people having the advantage of expert knowledge, unlimited capital and long-distance connection, the latter being absolutely necessary to many subscribers. The independent companies, on the other hand, have the local interests and public spirit behind them, and, being able to obtain many privileges in the matter of rights of way, franchises, etc., which they have received without cost, they are given the preference at the same rates, and in many cases without regard to comparative charges. It is difficult for the eastern telephone interests to realize the strength of the opposition in the central States, particularly immediately south of the lakes, and it would not be easy to find many towns of 10,000 or over in these six or eight States without an opposition company.

THE FINANCIAL SIDE.

There has been a decided change for the better in monetary circles this week. It has sprung from the development of a very comprehensive plan of the exchange bankers to stop gold exports, and the deposit by the banks of approximately $24,000,000 gold with the government, establishing the reserve at $110,000,000. These movements at once checked fears of another bond issue, and a premium on gold, which in turn stopped the senseless selling of investment securities. Up to date there has been no disposition of capital to do more in stocks than to hold on to what they have got. However, no more was expected. Prices have been hardened on a level slightly above the low, and are now pointed upward. The professional wreckers, by courtesy called bears, have failed in their attempt to create a panic and are just now busily engaged in evening contracts. The business world is seriously depressed, and no improvement is expected until Fall. The business-like way in which the campaign was opened in this city by the Republican committee added to the favorable sentiment. There are many who believe that the silver craze will culminate at the Bryan circus at the Madison Square Garden, and from that date out the tide will run towards the sound-money camp.

Electrical stocks were quiet and steady, hardening with the balance of the market during the latter days of the week. The high class bonds, not only those of the Edison Illuminating Company of New York, because of their relatively low price, have commanded some attention from investors.

The mechanical development of paramount interest to financial, electric circles has been the test of the air motor on the Third Avenue line. If accounts are to be credited, this apparatus is but little short of a phenomenon. But oftentimes, especially where a sale is on the carpet, the public is the last to get the facts. The State Railroad Commissioners will naturally be called upon for permission to change the motor power, in the event of the adoption of the air motor. They are not likely to overlook the fact that a pressure of 2,000 pounds per square inch is to be carried beneath a lot of passengers, through crowded streets, etc.

By general consent, New York rapid transit plans, propositions and projects are taking a mid-Summer vacation that promises to extend beyond the election.

On the Boston Exchange, Bell Telephone dropped 5 points to 195 up to Thursday and subsequently rallied 2. Erie Telephone lost 1 point, closing at 55. New England Telephone was held at 95 throughout the week. Westinghouse common was 23 @ 24 and the preferred 49 @ 50.

New York, August 1. BAIN.

"Electrical Review" Is Way Up Front.

[*From the Home Magazine.*]

The ELECTRICAL REVIEW has just completed its twenty-eighth volume. It stands in the very front rank of electrical papers of the world.

PERSONAL.

Professor Alexander Graham Bell has received the honorary degree of LL.D. from Harvard University.

Queen Victoria has conferred the Knight Grand Cross of the Royal Victorian Order on Lord Kelvin.

Mr. J. H. Rhotehamel, of the Columbia Lamp Company, St. Louis, is enjoying the cool breezes of New York for a few weeks.

Mr. H. T. De Puy, secretary of the Babcock & Wilcox Company, N. Y., is making his headquarters for a few weeks in Boston, looking after the interests of his company in that section of the country.

Charles R. Barnes, of Rochester, N. Y., having been certified by the State Civil Service Commission, has been appointed consulting electrical engineer and electrical expert to the New York State Railroad Commission. The salary is $3,000 a year.

Mr. Allen R. Foote, who is well known to electrical men, has announced himself as the Republican candidate for Congress from the Eleventh Congressional District of New York city. This district is now represented by William Sulzer, a Tammany man.

Hon. H. L. Storke, president of the Empire State Telephone Company at Auburn, N. Y., was a New York visitor last week. Mr. Storke is also the postmaster of his city, and is just now weighing the questions of gold, silver and third party in his somewhat puzzled mind.

Mr. Geo. A. McKinlock, president of the Central Electric Company, of Chicago, sailed for Europe on Wednesday of this week. Mr. McKinlock has been quite seriously ill for several months past, but is now enjoying greatly improved health. Before starting into active work he wisely takes an ocean voyage, returning to his office by September 1.

Mr. Union Noble Bethell, general manager of the New York Telephone Company, returned last week from a tour through England, Norway and Sweden, much refreshed by his well deserved outing. His adventures in the land of the Midnight Sun were of a startling nature, and a number of his friends are enjoying their modest but highly interesting recital on the piazzas of the Crescent Club these Summer evenings.

Mr. T. Harry Grimley, who for over two years past has ably and intelligently filled the position of cashier of the ELECTRICAL REVIEW, has resigned, to enter business for himself. He and Mr. Charles F. Harper have formed the American Publishers' Collection Company, with offices at 114 Nassau street, New York city. This company will make a specialty of collecting for publishers overdue subscription and advertising accounts. The ELECTRICAL REVIEW extends its best wishes for Mr. Grimley's success in his new venture.

Mr. C. A. Ross has resigned his position as the representative of the General Electric Company in Kansas City, Mo., as this company has discontinued its office at that place. On July 1 Mr. Ross was given the agency of the Sawyer-Man Electric Company for Kansas City and the surrounding territory. He was engaged in the sale of electric lighting apparatus for the Thomson-Houston and General Electric companies for five years, and sold a large number of plants in Missouri and Kansas. The ELECTRICAL REVIEW congratulates the Sawyer-Man Electric Company on securing the services of Mr. Ross.

The Cleveland Strike Settled.

The strike at the works of the Brown Hoisting and Conveying Machine Company, Cleveland, Ohio, has been settled upon the terms offered to the strikers by the company on the day the strike began. The strike was a very annoying one while it lasted, and considerable bad blood resulted, and some was shed, good and bad. Both the company and the men are to be congratulated over the amicable settlement. Mr. W. A. Stadelman, manager of the New York office of the company, is naturally much elated over the settlement of all difficulties, as he has a number of large orders waiting to be filled.

LATER—On Saturday, August 1, the strike broke out again, the men claiming they had not understood the agreement. It is thought to be only a temporary outburst, and settlement is expected this week.

A Subway in Baltimore.

Mayor Hooper, of Baltimore, Md., has signed the ordinance appropriating $1,000,000 city stock for laying an underground conduit system for telegraph, telephone, electric light and other wires. The ordinance will be submitted to the voters of the city at the election in the Fall, and, if approved by them, the stock will be issued.

The Madison Avenue Storage Battery Cars.

Mr. Isaac L. Rice is quoted as saying that he knew of no notice to the effect that the storage battery cars would be removed from the Madison avenue line in New York city. The cars are doing perfect service, and the agreement under which they were put in operation, November 1, 1895, requires that they should be run until November 1 1896, in order to demonstrate the life of the batteries. Up to the present the batteries have not cost a cent for repairs or renewals.

This Appealed to the English Mind.

[*From the London Electrician.*]

"Sold, but we have others," was the announcement which appeared on a card on one of the large Brush arc-light machines that formed part of the exhibit of the Brush Electric Company, of Cleveland, at the recent Electrical Exhibition in New York.

The Boston *Herald*, on Sunday last, published a full-page colored illustration of the main operating room of the New England Telephone Company at 125 Milk street. "Hello Headquarters" was the title to the picture, which was an artistic and true-to-life reproduction of the exchange.

The Atlantic City Railroad Accident.

The recent railroad collision near Atlantic City, N. J., causing the death of 44 persons and injury to over 100 others, has attracted attention to the safety devices in use on railroads. From an able editorial on the subject, in the N. Y. *Sun*, we publish the following in relation to derailment by use of electricity:

While the introduction of the derail furnishes a large measure of safety, it has been found that in practical operation accidents have occurred by reason of careless signal operators reversing the signals immediately in front of a train moving at high speed toward a crossing. It was thought that no operator would be so unmindful of his duties as to do this. And since human agency can not be relied upon, the aid of electricity has been invoked, and by a very simple device, using the ordinary rail circuit and electric lock, the train can control the signals and derail at any distance from the crossing, and after the first pair of wheels have entered the limits of the rail circuit, and until the last pair of wheels have passed over and beyond the crossing, the operator is powerless to change any levers controlling conflicting routes of signals, so that, when the engine passes the distant signal at clear—some 1,500 or 2,000 feet from the crossing—he knows that the route to and over the crossing must be clear and unobstructed.

There seems to be no good reason why all grade crossings should not be protected in the most complete manner. The advancement of the art of signaling and interlocking now provides all the appliances necessary to make the passage of trains over grade crossings entirely safe, and we find no record of accidents at crossings where these appliances have been installed.

The rocket taught us how to go, the air brake taught us how to stop; and signals and interlocking devices teach us where to go and when to stop; and not until we have provided these safeguards shall we realize the maximum of safety in railway travel.

The editor of our contemporary, *The Electrical World*, has published the first article by Tesla on Roentgen X rays, which appeared in the ELECTRICAL REVIEW, in three different issues. First, in its so-called digest, with proper credit to this journal, and twice afterwards republished from certain daily journals that had taken the matter bodily, without credit, from our columns. Our contemporary is certainly very fond of this article, or its space is not particularly valuable nowadays.

An esteemed patron of the ELECTRICAL REVIEW, in sending in a special card for the hot weeks, makes the following sensible and timely remarks: "You understand that trade is in doubtful prospect. The writer, however, believes in keeping the wheels moving for trade when there is a short demand more urgently than when there is an over-supply. In other words, the writer prefers to spend money getting business rather than going without it in things which promise to be dull."

THE NEW YORK CONVENTION AND EXPOSITION.

REPORT READ BEFORE THE NORTHWESTERN ELECTRICAL ASSOCIATION, MARINETTE, WIS., JULY 16, 1896, BY THOS. R. MERCEIN.

In April last I was appointed by the president and board of directors to represent this association at the May Convention and Exposition of the National Electric Light Association in New York, so I arranged matters accordingly, and on Monday morning, May 4, reined in my foaming valise at the Murray Hill Hotel in Gotham, and soon thereafter invaded the National headquarters and presented my credentials to Secretary Porter. That genial gentleman promptly decorated my person with "Honorary Guest" and other badges, introduced me to his fellow officers and a number of delegates, and made me generally welcome. An hour after I was in a front seat at Convention Hall and seeing President Wilmerding delivering his address. I can not say hearing him, for noisy preparations for the Exposition were close at hand, and the sound of active saws and hammers came preponderant through intervening muslin walls, and drowned the presidential diction in their turmoil. It remained for the more vigorous lungs of our own honorary member from Cincinnati; lungs inflated with a sense of wrong, and impelling a voice keyed by indignation to unusual resonance, to rise superior to mere carpenter's tools in action, and the rasping of saws sounded but as a harsh murmur, and the sharp staccato of hammers as but a subdued tapping, as the member from Cincinnati scored, for alleged neglect of duty, a committee appointed to harmonize the relations between manufacturing and central station companies.

Cleveland's representative, with San Francisco's as an ally, rallied to the defense of the besieged, and, at their own request, the big guns of the assailed committee were discharged in the face of the enemy. When the smoke of battle had cleared away, the erstwhile combatants shook hands, figuratively, across the bloodless chasm, and the convention adjourned to quieter quarters.

The incident revealed to me an apparent feeling of antagonism between the National Association members and the manufacturers; a feeling which may exist, but has not been evident in our own meetings.

During the succeeding three days, I was in attendance at the different sessions, and heard a number of papers read and discussed, but there was no paper or discussion on the subject of municipal lighting and ownership, a question which year by year is obtruding itself more and more persistently upon central station interests, and which the National Electric Light Association, above all others, should thoughtfully and thoroughly consider, and arrive at some well advised and concerted action upon.

It is not within the scope of this paper to suggest what this association should do in the matter, but there is certainly a tendency toward municipal ownership of electric lighting and street railway plants. It is immaterial from what causes it arises, whether dissatisfaction with existing plants, or jealousy of corporations, or the desire for patronage that city ownership would confer on the dominant political party, or from an honest belief in the better methods of municipal ownership. A vital question before this association is, what steps should we take, as an organization, to defeat, in the interests of our members, and, as we believe, the interests of the public at large, the tendency referred to. Thanks to the efforts of this association, scantily appreciated as they seem to have been, Wisconsin laws now contain but few features detrimental to electrical interests; but we are a northwestern, not merely a Wisconsin, association, and it is not sufficient to only prevent, as we have prevented, the enactment of unjust laws. The danger lies in city, town, and village boards of control, influenced largely by unintelligent public demand, by selfish and perhaps sordid motives, and, while we must not knowingly infringe upon the unquestioned rights of a community to work out its own salvation, we may endeavor by all legitimate means to educate that community to the justness of the position we assume on this question of ownership. No investment, in any business serving the public, can be permanently safe, when in opposition to a generally adverse public opinion; therefore, the public must be with us to insure success. I hope that some day, near at hand, there will be a joint meeting of delegates from the National, the Northwestern, the Southwestern, the Canadian, and other kindred associations, to discuss this matter and take action thereon.

The papers presented at New York were, as a rule, too theoretical and technical for the average electrical education, and were not calculated to meet the demand for general practical information. The discussions were not at all spontaneous, and very few took part, and those largely at the solicitation of the presiding officer, an evidence that the subjects were not of general interest, or were too technically treated. An exception was the paper of Mr. L. A. Ferguson on "Acetylene Gas," a carefully prepared and intelligent statement of facts as the author found them. Mr. L. H. Rogers's paper on "Evolution of the Arc Lamp" combined history, suggestion and prophecy in an interesting manner, and demonstrated the possibility of combining fact, fancy and foresight in an enjoyable convention paper.

I was struck by the almost aggressive manner of those desiring information on the subject in hand. There seemed a desire to trip the author up, as it were, and many of the questions asked aimed, apparently, at his discomfiture. You will bear in mind that I was there, among other reasons, to observe critically the methods and manners of the National Association in convention, with the view of so influencing our own comparatively new organization's ways as to include the virtues and exclude the vices of the older and more experienced body; therefore, I beg to say that such criticisms as I make are not in an unkindly spirit, but that we may profit by lessons learned therefrom. It pleases me to believe that in uniformity of attention, spontaneity of even-tempered discussion and courtesy to speakers, the Northwestern Electrical Association has nothing to learn from the parent society, whose success and influence it, nevertheless, admires, and whose many excellent features it is glad to adopt.

The National Association has a rule requiring all papers to be in the secretary's hands some time prior to the convention at which they are to be presented. The purpose of the rule is that the papers may be revised if deemed necessary, and that they may be printed in advance and copies mailed to all members before the meeting, with the view of eliciting spontaneous discussion. In my judgment, that plan has serious defects outweighing its alleged advantages, at least to our association.

1. The conditions of the National and our association are different. The one has a comparatively large income from its fees and dues which enables it to incur larger printing, postage and general expense than the other would be justified in. It employs a permanent secretary-treasurer at a salary that enables him to devote practically his entire time to the duties of his office, and the revision of papers and their advance printing and distribution are but a part of his routine work. The secretary of the other realizes that his salary does not justify him in the labor now incumbent upon him, to say nothing of additional work, and will willingly relinquish his official position and the emoluments thereof at the expiration of his term of office.

2. The National Association, with its prestige of age and reputation, is more generally representative of electrical interests, and therefore attracts more public attention at present than the other; consequently its regulations command the ready acquiescence of the members and the authorities and experts of the profession, as well as large audiences and wider publicity.

3. Few men of proper pride and self-esteem would submit their gratuitous papers to the advance criticism of any individual or committee, or consent to any erasures or alterations of their own matter. It would, therefore, be difficult to secure papers from competent authors cognizant of the rule. Of nine papers read at the New York Convention, but two were submitted in advance.

4. The freshness and interest of the papers would be decreased were they read beforehand by the members of the convention. One of the aims of the association is to secure the personal attendance of the men whom it has complimented by the request for papers, and who have complimented it by their compliance, as well as the presence of interested auditors to listen to something new. To handicap the lecturer or discount the novelty of his views by prematurely publishing them would not, in my opinion, be a satisfactory method of conducting the important literary and educational features of our convention.

Papers should be published, as they are, after delivery, for preservation and future reference, as well as in courtesy to their authors. I have mentioned some of the disadvantages of the rule referred to, and "there are others." Its only advantages seem to be promotion of discussion, meaning criticisms prepared, like most impromptu speeches, in advance, and the opportunity of eliminating advertising and other objectionable matter, meeting a possibility which is not complimentary to the programme committee or the gentlemen it asks favors from. I have given some space to this subject because several members have spoken to me of the advisability of such a rule.

Apropos of lectures, those given in New York by D. McFarlan Moore on the "Light of the Future," and by Max Osterberg on "Roentgen Rays," were very interesting, especially the former. A large stage, well lighted by the prevading moonlight from Geissler tubes, was a delightful novelty, and the striking personality of the nervous young enthusiast, whose name and fame are growing apace, was pleasant to see. The beauty and efficiency of the new light was also demonstrated on the opening night of the exposition, when Governor Morton, of the Empire State, appeared framed in a 16 to 1 silver radiance that must have been a revelation to one of his golden proclivities. Curious that the oratory of a gold-standard candidate should have been described as "silver tongued," but possibly because it was a matter of sound, not substance, and the masses seem to yearn for bi-metalism.

My interest in Roentgen rays was much enhanced by a personal meeting with Mr. Edison, who interrupted himself in active fluorescent screen work to talk with me of our association and its future potentiality. "All central station men in the West should join you," said he, and it is needless to say that I thoroughly agree with him. The kindness of Professor Max Osterberg made me one of a small party at a practical demonstration of the utility of the famous rays in locating a bullet in the arm of a Bellevue Hospital patient, shot in a saloon as well as in an arm. Unlike the Chicago man, reported as having been shot in the suburbs—a dangerous locality for the average Chicago citizen to be wounded in—this man had every prospect of a rapid recovery.

Mr. Tesla narrowly escaped meeting me. All that saved him was the fact that he remained in his downtown laboratory while I searched for him at the exposition end of his telephone line. The torque of his new generator probably interested him more than the talk of his new long-distance acquaintance.

The exposition itself was a well arranged series of interesting exhibits, from the basement, with its modern self-stoking boilers and its high-speed direct-connected, independent and combined engines and generators, to the third floor and its galleries, with Edison fluoroscope room, vacuum-tube apartments, Osterberg, and other exhibits. Everything in successful operation but one, and that was the electric elevator scheduled to carry delegates to the Convention Hall on fifth floor and visitors to the various exposition halls. I have rarely heard more variegated and descriptive profanity than in that elevator. One entered it at the basement a gay, gladsome, trustful boy; middle age and deep suspicion overtook him at the third floor, and at the fifth decrepitude and blasphemy claimed him for their own. The motive power seemed to culminate in sundry stops that protruded here and there, and when the musician in charge played a fugue upon them, the elevator reluctantly left its moorings and solemnly rose to the occasion. Frequently there was a hitch and nothing rose but the temper of the occupants, apprehensive of indefinite mid-air suspension in this modern coffin of Mahomet. I think, perhaps, with a few easy chairs, a lunch counter and a time table, a man of leisure might have taken the trip in some comfort, though the scenery is monotonous.

The salient features of the main floor were: 1. The model of the Niagara power plant, with the genuine roar of the cataract by telephone precisely as heard with his own ears by Professor Bell. The identical receivers, the mechanical ones, of course, being on exhibition there as evidence of the fact. I listened, too, but as I stood there with my body in New York, and my ears, so to speak, at Suspension Bridge, the roar of the cataract spoke to me in plain Bowery American, "Say, give some one else a show, old man," and I meekly surrendered the roar to a "Chimmie Fadden" behind me.

2. The Erie Canal electric traction model, which I believe some of our

bright minds here could materially improve upon.

3. The Electric Heating Company's exhibit, where deft-handed and attractive maidens evolved toothsome dainties from electric ovens in which spry young volts struggled against obstinate ohms to produce adequate amperes for a batch of biscuit. I courted indigestion and the blooming bakeress assiduously, but made more impression on the produce than on the producers.

4. The General Electric Company's exhibit, including the little electric theater with its miniature dramas of light and color effects.

5. The Edison company's show of ancient as well as modern apparatus, shocking interested visitors freely, with marked preference of the attendants for feminine victims.

6. The Teleseme annunciator system whereby the topmost dweller in a modern sky-scraper by the turn of a crank calls successfully for any desired article from a cocktail to a coffin.

7. And *ad libitum*. Everything in the electric line. The side aisles were flanked by handsomely decorated canvas caves, where genial human spiders lured willing flies to the webs of interest. and furtive but excellent cigars paid tribute to American sympathy with struggling Cuba.

As a whole, the exposition well deserved the financial success I fear it missed. Certainly the electrical press, whose cosy corners and bright and agreeable representatives were prominently in evidence, did its full share in furtherance of the project.

There appeared to be but little general provision for the entertainment of convention delegates and visitors, although there were numerous little dinner and club parties for the fortunate few.

The free, spontaneous courtesy and hospitality of the West is in marked contrast on such occasions with the comparatively constrained and conventional manners of eastern entertainers. It was a western man, translated, like myself, from the metropolis, and doubtless, from his name and handsome teeth, a descendant of the classic beast who escorted "Red Riding Hood," who kept open house at the Murray Hill, and at uncanny hours guided curious Westerners through purlieus where almond-eyed celestials dance under their paper lanterns, and bridge-jumpers flaunt the laurels plucked from a falling profession, though it didn't require laurels to make the location Bowery.

There were, doubtless, other hospitable hotel parlors, and other groups of entertainers and entertained, but my experience was almost limited to the one referred to, and presided over by one of our most genial associate members. It was a pleasant resting place, where good wine and gentle wassail abounded. One entered weary and athirst. Black angels ministered unto him, and he departed when he listed, "A being erect upon two hind legs and bearing the outward semblance of a man." There were several impromptu bay and river excursions to neighboring points of interest. Bedloe's Island, with its colossal Statue of Liberty, was a popular Mecca, and gallant sons of our glowing West joined sundry Gotham maidens in a perilous pilgrimage to the outstretched hand of the gigantic goddess, and there Chicago knickerbockers and New York bloomers met on common ground, in short pants, after the breathless climb.

Manhattan Beach had, too, its coterie of tourists; in fact, no resort within an hour's sail or ride was destitute of delegates. Part of the White Squadron lay at anchor in the lower bay, and in my thirst for knowledge and material for this paper, I hied me down there and boarded the cruiser "New York," the flagship of the North Atlantic Squadron, and flying the pennant of Rear-Admiral Bunce, who, by no fault of his, is the brother of that quiet and retiring member of ours who in general electric interests becomes an animated cake of sapolio, and scours the face of Wisconsin till it reflects credit upon its citizens and himself.

I fully intended making a most critical inspection of that vessel, and laying before you the interesting results thereof, but she happens to be commanded by Captain F. S. Schley, a typical, genial Baltimorean, who welcomed me so warmly and entertained me so pleasantly that I forgot I was in a famous war vessel, talking to the man who rescued Greeley from the continental refrigerator, and who is one of the fighting captains selected by the government to uphold national honor and glory if Spain goes too far with the "Gem of the Antilles;" and only after seating myself in solitary state in the steam cutter, which his courtesy provided for my shore-going, did I realize that my examination of the cruiser was limited to "the seclusion that the cabin grants." The following day I was speeding westward, with New York, its convention and exposition a pleasant memory, only.

Roentgen Rays Abroad.

[*From the New York Herald.*]

The medical authority of the *Herald's* European edition calls attention to the recent enlargement of the uses of the Roentgen rays in medical practice. At first they were only used by physicians in surgical cases, in searching for projectiles, foreign bodies and lines of fracture. But by means of the fluorescent screen, our foreign medical correspondent says, "we shall now be able to undertake anatomical and physiological studies and make the diagnosis of internal diseases."

The fluorescent screen is composed of a glass plate, to which is glued a sheet of cardboard half a centimetre thick, in which has been cut a rectangular opening 10 centimetres wide by 25 long. Over this piece of cardboard is fastened a second piece and the space between the second piece and the glass is filled with a uniform layer of double cyanide of potassium and platinum, which become fluorescent under the influence of the Roentgen rays.

As a notable instance of the increasing value of Roentgen rays, the *Herald's* European edition states that "M. Grummach, of Berlin, has diagnosed with the fluorescent screen different cardiac and pulmonary lesions; one of these patients, treated a year and a half before for heamoptysis, showed cicatrized tubercular lesions that appeared in black spots on the screen."

[*From the New York Journal.*]

BERLIN, July 23.—Dr. Markuse, whose "interior" has been photographed thirty times within the past twenty days by the Roentgen process, has lost all of his hair as a result and his face has assumed a brownish color. The skin has peeled off his breast where the Hitorf instrument nearly touched it, and on his back what was first a sore finally developed into a bleeding wound, surrounded by burnt-looking cuticle. The victim is exhausted.

Automatic Coal-Weighing Machines for Power Stations.

The late Hon. Eckley B. Coxe, who strongly advocated the substitution of a continuous record of actual boiler performance for the prevailing system of occasional tests, once stated the matter very tersely, saying:

"I am not so much interested in knowing what some expert may be able to do with my boilers as to know what work my firemen are actually getting from them every day."

To know this, however, says a writer in *Cassier's Magazine*, means the measuring of the intake and the output—means accounting for the entire supply and production, so that the necessary comparisons may be made for formulating the result. The automatic weighing machine supplies this requirement, automatically handling coal and water, much after the manner of an ordinary water meter, say, interposed in a water pipe, or a gas meter, for that matter, giving a continuous and reliable record of what has passed through it.

In another way, too, may the automatic weighing machine serve a good purpose. Daniel Webster has been quoted for the way in which, in one of his speeches, he emphasized "the tremendous power of six per cent." Certainly the investor of to-day looks sharply enough to the difference of one per cent in the rate of interests chargeable against him. But does he look as closely to the other components of the "cost?" For instance, recent experiments indicate that the anthracite coal generally used for steam making will hold about four per cent of water without much dripping; and much of that coal is "watered" to this extent before delivery. If, now, the coal pile be replenished twice a year with wet coal, it is evident that the buyer pays the interest rate plus eight per cent of the purchase price as the cost of the capital employed in "carrying" the fuel account.

Although the coal can not, for obvious reasons, always be obtained dry, the drying may be readily effected in nearly all power stations before the coal reaches the bins by using heated air drawn from the upper part of the boiler rooms. Then, by weighing in through an automatic weigher and reweighing in the same way, first to the bins and next directly to the furnaces, all of the required facts are obtained. The first weighings, by showing the amounts taken in and delivered to the bins, indicate the evaporation, and a comparison of the records of the second and third readings will show, at any time, the amount held in storage in each bin, besides giving the amount chargeable to each set of boilers.

Pacific Electric Company.

The Pacific Electric Company, of Tacoma, Wash., has ceased to exist as a corporation in that State, having been purchased by Wisconsin people. The business will be continued as a new corporation at La Crosse, Wis., under the name of the Pacific Electric Company. The company manufactures several meritorious electrical novelties and specialties. Mr. A. F. Espersen is general manager.

An Electric Scorer for Fencing.

A good many members of the profession interested in fencing were present on Wednesday, the 24th ult., at the fencing rooms of the veteran Mr. Bertrand, in Warwick street, to witness a competition which was decided by means of the electric "Umpire," the invention of Mr. Muirhead Little, F. R. C. S., England. The object of the invention was to overcome the well known difficulty of judging hits, says the London *Lancet*. This difficulty is so great and general that in Paris it is said that disputes are the rule and not the exception in public competitions. The end in view has been achieved by covering the front of each jacket with fine copper or brass wire gauze and connecting this with the adversary's foil and an electric bell (of the burglar patent) and battery in the same circuit. It follows that when a hit is made the circuit is closed and the bell rings and continues to ring until stopped by the person in charge. A special arrangement in each foil handle provides that only a direct point produces a ring. Two entirely electrically distinct circuits are used, each including a bell, foil and jacket; flicks, or blows, or grazes produce no result. The bells being of different tones and, moreover, placed on opposite sides of the room, there is no difficulty in deciding who has scored a hit, or, in cases of almost simultaneous hits, who delivered the point first. By a very simple arrangement, the wires passing from the batteries to the combatants' collars are kept out of the way, however sudden may be their movements of advance or retreat. Six selected amateurs competed for a pair of foils, and five bouts were fought. The trial was completely successful and the spectators expressed themselves as well pleased with the result. The well known swordsman, Captain Hutton, who was present, congratulated Mr. Little on the success of his invention and said, in thanking him for giving him and others the opportunity of seeing it, that it would be of great value at such competitions as the Royal Military Tournament, for the best judges made mistakes, while the electric current could not err. Captain Hutton afterwards tried the apparatus on his own person in a bout with the foils, and testified to the complete absence of any restraint on his movements when using it.

LITERARY.

Fifty years of uninterrupted publication, and a wide circulation among the American people, have rendered the *Scientific American*, New York, a household term. The editors have issued a handsome golden anniversary number, which reviews the progress of the arts and sciences during the past half century, and is enriched with copious illustrations, showing the development of the steamship, the railroad, the telegraph and the telephone, printing, the bicycle, and the reaper; and it includes portraits and sketches of celebrated inventors and men of science, and the full text of a prize essay on the progress of invention.

TELEPHONE NEWS AND COMMENT.

The Erie Telegraph and Telephone Company made a net gain of 207 subscribers in June. Total gain for first five months, 1,103; total number connected, 19,96 .

New England Telephone and Telegraph Company has declared a dividend of $1.25 per share, payable August 15 to stock of record July 21. Books close July 21 and reopen August 16.

The Electric Appliance Company, of Chicago, have remodeled their American telephone switchboard, introducing a number of important improvements, which they claim will make their board one of the most desirable on the market. They will be pleased to give full particulars on application. Telephone men, generally, will be interested in this board.

The subway question is up for discussion in the Common Council at Syracuse, N. Y., and it is hoped that the matter will be speedily adjusted and the necessary permits be granted the telephone and electric light companies to place their wires under ground. The business men of the city have requested the council to order the subways put in before the repaving of several of the prominent streets in the center of the city, in order to avoid the tearing up of the new pavements in future for subway work. The telephone company is delaying moving into their new quarters until this is decided. The present capacity of the company's switchboard and cables is nearly exhausted, and the subway is very necessary now.

Mr. James A. Morrisse has formed a company at Paterson, N. J., called the Passaic & Bergen Mutual Telephone Company, with a capital of $150,000. The offices of the company are in the Morrisse Building, Main and Ward streets, Paterson. The officers are Francis C. Van Dyk, president; James A. Morrisse, vice-president; Louis A. Piaget, treasurer; Walter Kip, secretary, and Lionel Finzi, assistant secretary. The board of directors is composed of F. C. Van Dyk, James A. Morrisse, James F. Stewart, Wm. B. Gourley, John J. Bowes, Joseph V. Morrisse, Wm. Jay Holmes, Chas. A. De Arnaud, Louis A. Piaget, Ezra M. Stiles, Nathan Fleischer, Walter Kip, Charles Curie, William High, Andrew F. McBride, William M. Smith and Leopold Meyer.

The new telephone building at Syracuse, N. Y., is nearly ready for the contractor to turn over to the Central New York Telephone and Telegraph Company. The third floor is nearly ready for W. W. Nicholson, the general superintendent of the company, who, with his clerks, will soon occupy all of that floor. Mr. Nicholson has been occupying temporary quarters in the Wieting Block. A meeting of the division superintendents of the company was held at Syracuse on July 23, and after lunch at the Yates Hotel, all repaired to the new building, which was carefully inspected and favorably commented upon. There were present the following named gentlemen: W. W. Nicholson, general superintendent; W. S. Nicholson, electrical engineer; W. L. Burdick, division superintendent, Syracuse; Chas. N. Crain, division superintendent, Rome; Geo. W. Wood, division superintendent, Utica; W. W. Nightingale, division superintendent, Little Falls; E. V. Adams, division superintendent, Cooperstown; W. D. Hanchette, division superintendent, Watertown.

The Pacific Telephone and Telegraph Company, of San Francisco, has issued the following circular to the public:

The management of the Pacific Telephone and Telegraph Company, believing that, outside of the 1,659 residence subscribers connected with the San Francisco exchange, there are two or three thousand or more householders who really need telephones and do not know it, never having used one regularly, has decided, for advertising and educational purposes, to issue 1,000 kitchen telephone sets at the rate of 50 cents per month for the installation of the kitchen telephone and unlimited switching from house to office, or from house to physician, or from house to any other one subscriber in the San Francisco exchange.

Other switches from this telephone may be made to any other one of the 6,715 subscribers (connected April 1, 1896) by the payment of a nickel at the time of making the switch; or the subscriber can contract for 50 cents a month additional, for unlimited switching with any other one subscriber; or by the payment of $1.75 per month he can have unlimited switching from this telephone to all of the subscribers connected with the San Francisco exchange.

This telephone is placed in the kitchen only, where it can be readily used to the butcher, grocer, coal dealer or to the physician, druggist, etc. These telephones are for outward service only, and on account of the saving made by the company, in the fact that no arrangements are made at these telephones for being called up, and the saving at the central office for the same reason; and as for this purpose, a number of stations can be placed upon one pair of wires; and, as stated above, for the general benefit such a service will be to the system as a whole, and as an advertisement, and as an educator for the present non-subscribers, the telephone and all the service mentioned is given at the rates quoted above.

The terms for regular residence service, which includes metallic circuit, long-distance transmitter, express service and unlimited use, are $5 per month, or $2.50 per month and five cents for each outgoing switch (inward service free).

This is the service we know you will want a little later on, after you find, as you surely will, that the telephone is as necessary in your household as gas or water.

ELECTRIC RAILWAY NOTES.

M. A. Coolidge, of Fitchburg, Mass., will build an electric road from Fitchburg to Amherst.

It is reported that the Manhattan Railway Company, of New York city, will make a test of the Hardie air motor on one of its elevated roads in the Fall.

It is expected that next year the electric road, which is now being built between Jamaica and Hempstead, L. I., will be extended to Far Rockaway.

Mr. Dayton Hale denies that the Consolidated road has bought the Atlanta, Ga., Railway Company's property, and asserts that no negotiations are pending looking toward that end.

The Consolidated Traction Company of New Jersey has paid to the Comptroller of Newark, N. J., $54,742.23, being five per cent of the gross earnings of the company for the year ending April 30, 1896.

The Third street car barn of the Milwaukee, Wis., Electric Railway and Light Company was destroyed by fire on July 20, causing a loss of $25,000; fully covered by insurance. The barn will be immediately rebuilt.

It is reported that an electric railway will be built connecting Kansas City, Leavenworth and Atchison, Kas., and St. Joseph, Mo. The line will be 80 miles long. It is said that the only serious obstacle is securing a franchise for a right of way out of Kansas City.

Each of the elevated railroad companies in Brooklyn, N. Y., has made application for 50 per cent reduction on the assessed value of the structures at $170,000 per mile. They contend that the trolley competition has greatly reduced their earning capacity, and assert that in fact the roads are now run at a loss.

The West Roxbury & Roslindale, Mass., Street Railway has petitioned the Railroad Commissioners for an issue of stock not exceeding $50,000, and $150,000 five per cent 20-year bonds, principal and interest payable in gold, for the purpose of funding the debt incurred in the construction of the road.

The Massachusetts Railroad Commissioners have granted permission to the Gardner Electric Street Railway Company to issue $50,000 stock to equip the road with electricity, and $30,000 of six per cent 20 year bonds for funding the floating debt. The commissioners have also approved the issue of $104,000 capital stock to the Brockton Street Railway Company for improvements.

The Brooklyn Heights Railroad Company, of Brooklyn, N. Y., has made arrangements with the Sea Beach Railroad Company for a route to Coney Island. Through the extensive transfer system on the Heights road a passenger can now make the trip to Coney Island and back from any part of Brooklyn for 20 cents. This plan, it is believed, will considerably relieve the overcrowding of trolley cars.

Rules for the Providence Horseless-Carriage Race.

From September 7 to 11 next the Rhode Island State Fair will hold its annual exhibition at Narragansett Park, Providence, R. I. There will be held at this time a 25 mile horseless-carriage race for money prizes. The following are the rules of the contest:

Entrance fee, $100 per carriage, payable August 10. No conditional entries accepted.

The race to be five heats of five miles each day of the fair, September 7, 8, 9, 10, 11, 1896.

Ten carriages to enter and five to start, or no race.

Vehicles must be able to show a rate of speed equal to 15 miles an hour to compete in the race.

Vehicles must carry one person in addition to the driver. (Weight carried must be 165 pounds.)

Only vehicles propelled by other than animal power allowed to compete.

Vehicles not limited in number, but no one owner can enter more than one carriage and start in the race. If the starters number 10 or more, for reasons of safety the carriages may be divided into classes and started in two or more divisions.

Division of the race purse will be in the following proportion to the winners of the race: 50, 25, 15 and 10 per cent of $3,000. First, $1,500; second, $750; third, $450; fourth, $300.

To the vehicle winning the greatest number out of five heats, first money, etc.; but all vehicles must stay in throughout the five heats.

Distance waived, but those vehicles which do not cover the course with an average speed of 15 miles an hour will be disqualified.

Each vehicle will be required to carry its number in large figures; other printed matter not permitted.

Contestants will be required to conform to such rules and regulations as may be made by the association, particularly in regard to their position on the track. All legal responsibility is thrown upon the contestants, the association declining to assume any whatsoever.

In case that less than five carriages shall respond to the call of the starting judge, the race shall be declared off, and to those answering the call and who are ready with their vehicles, their entrance fees paid in shall be refunded. With 10 or more entries received, the association will open, in addition to the speed contest, prizes to be competed for as an exhibition, judging to be made on points of manageability, etc., for $2,000, divided as follows:

First prize, $1,000 and the association's gold medal and diploma.

Second prize, $500 and the association's silver medal and diploma.

Third prize, $300 and the association's bronze medal and diploma.

Fourth prize, $200 and the association's diploma.

In the exhibitive competition the following percentage scale of points shall be made the basis of awards:

Speed, 40 per cent; control, 20 per cent; simplicity, 10 per cent; cost, 10 per cent; maintenance, 5 per cent; appearance, 10 per cent.

Vehicles may compete, if desired, in both racing and exhibition.

Entries will close August 10, 1896. Entry blanks will be furnished on application to Rhode Island State Fair Association, Providence, R. I.

About 150,000 persons travel over the Bergen Beach line of the Brooklyn Heights Railroad Company every week.

The Alton Railway and Illuminating Company.

The Alton Railway and Illuminating Company, of Alton, Ill., is running an electric station for light and power service with praiseworthy success. The company operates under lease the Alton gas plant, the stock of which is controlled by Mr. J. G. White, the well known electric railway engineer of New York city. The company does all the electric lighting in Alton and operates the only street railway in the city. This is an eight-mile single-track electric road connecting Alton with North Alton and Upper Alton. The population of the three places is about 18,000. There are a number of heavy grades on the road, one of which is located very near the power house. The lighting plant has a capacity of 3,000 alternating incandescents and 125 arcs, which are used for both street lighting and commercial service.

The following statement of net earnings and expenses of the Alton Railway and Illuminating Company for 10 months of the current year, from September 1, 1895, to July 1, 1896, will show that plants of this character are good investments when properly managed. The capital of the company is $250,000, and it has an equal amount of five per cent bonds. The statement follows:

Gross light and power earnings first six months		$14,222 58
Gross railway earnings first six months		13,187 59
		$27,410 17
Operating expenses first six months		14,189 09
Net earnings first six months		$13,221 08
MARCH EARNINGS AND EXPENSES.		
Railway	$2,264 40	
Light and power	2,251 58	
	$4,515 98	
Operating expenses	2,001 87	
Net earnings		2 514 11
APRIL EARNINGS AND EXPENSES.		
Railway	$2,280 20	
Light and power	2,128 98	
	$4,409 18	
Operating expenses	2,083 57	
Net earnings		2,326 61
MAY EARNINGS AND EXPENSES.		
Railway	$2,830 92	
Light and power	2,159 07	
	$4,989 99	
Operating expenses	1,928 51	
Net earnings		3,061 48
JUNE EARNINGS AND EXPENSES.		
Light and power	$2,094 87	
Railway	3,693 69	
	$5,788 56	
Operating expenses	2,005 65	
Net earnings		3,782 91
Total net earnings for ten months		$24,906 19
Estimated net earnings for July and August		7,000 00
Probable net earnings for the year		$31,906 19

Chinese Telegraphy.

[*From the San Francisco Chronicle.*]

According to the "Statesman's Year Book," all the principal cities of China are now connected with one another and with Peking, the capital, by telegraph. Recent visitors to China say, however, that telegraphing there is a laborious and an expensive process, and that the lines are a charge upon the State Treasury instead of a source of revenue.

The dispatches are, of course, sent in Chinese, for not one in many thousands of the natives knows any language except his own. But the Chinese have no alphabet. Their literary characters, partly ideographic, partly phonetic, number many thousands. It is simply impossible to invent telegraphic signals that would cover the written language. Here was an obstacle in the way of using the telegraph at all.

The difficulty was obviated by inventing a telegraphic signal for each of the cardinal numbers, and so numbers or figures might be telegraphed to any extent. Then a code dictionary was prepared, in which each number from one up to several thousands stood for a particular Chinese letter or ideograph. It is, in fact, a cipher system. The sender of the message need not bother himself about its meaning. He may telegraph all day without the slightest idea of the information he is sending, for he transmits only numerals.

It is very different with his friend, the receiver. He has the code dictionary at his elbow, and after each message is received he must translate it, writing each literary character in place of the numeral that stands for it. Only about an eighth of the words in the written language appear in the code, but there are enough of them for all practical purposes.

But the Chinese system has its great disadvantages. Men of ordinary education have not sufficient acquaintance with the written language to be competent telegraph receivers, and the literati are not seeking employment in telegraph offices any more than our college professors are. So the government recruits its employés with much difficulty. Besides, the patrons of the telegraph are comparatively few in number. There are almost no Chinese who have business relations all over the country, as is the case with many thousands of our business men. The public is not invited to buy stock in the Chinese telegraph lines, and if it was, nobody at present would buy with a view to dividends. The receipts do not equal the expenses, and the government makes up the deficit.

There is another great disadvantage of the Chinese telegraph system. All over the world the movement of railroad trains are regulated by telegraph. The orders received by the station agent are filed in plain view of the employés, and if need be the switchman may take temporary charge and carry out the instructions from the central office. Railroads have been introduced into China to a very small extent, and there is talk of greatly extending the service. But how about running the trains?

A writer in *Le Mouvement Colonial*, of Paris, says that if railroads are introduced to any extent in China the personnel must be exclusively European and American, or recruited from the literary class. He says the Chinese Government will not take foreigners into its service, and that the educated men of China, who alone among the people have sufficient knowledge of the written language to be intrusted with the actual running of trains, would refuse most emphatically to be either train hands or station agents.

This is one of the many small stumbling blocks in the way of China's progress, but it is quite effective in its way.

Electrical Apparatus and the Tariff.

In response to a circular issued by the Ways and Means Committee of the last Congress, designed to investigate the results of reciprocity, the Brush Electric Company, of Cleveland, Ohio, sent the following reply:

We sell through our agents to foreign countries. We have not a very large foreign trade, but a very extended one. We find difficulty in competing with the English and German manufacturers of electrical apparatus. They undersell us in almost every country.

We believe that the quality of American electrical apparatus is superior to that of English and German, but their labor is so much lower than ours that they make lower prices with as much margin of profit as we make.

If the tariff were taken off of electrical machinery in this country, we believe we would be swamped. The mere approach to or suggestion of the idea, and the uncertainties connected with it during the last presidential campaign on the part of certain parties unnecessary to mention, has cost us millions of dollars.

We favor the application of reciprocity to future tariff legislation. We believe it a most excellent idea. We carry it out, and we believe every other seller and purchaser carries it out in a large or a small way in the every-day affair of business life. Therefore, we see no reason, if it is a good principle universally applied, why it should not act as well in the case of one nation dealing with another.

In reply to your question as to what our estimate would be of the natural surplus for export, if all manufacturers in our lines were producing to their full capacity, we beg to state that none of the great factories of the country have been run to their full capacity during the past two years. Our factories are almost universally enlarged, and new capital invested therein as our business increases, so that, in a general way, we might say that, if the times were equal to what they were in 1892, the electrical factories of this country would be about equal to our domestic market. But we are all prepared to increase our investment and enlarge our business. Our government does little, if anything, toward encouraging our foreign trade.

The general effect of the reciprocity treaties made in 1890 was most favorable, and their repeal most unfavorable to the electric business.

OUR CANADIAN LETTER.

STURGEON FALLS, ONT.—The question of securing a system of electric light is under consideration.

LONDON, ONT.—The Rogers Electric Company have been awarded the contract for wiring the new House of Refuge at Sarnia.

GUELPH, ONT.—The contract for an electrical fire-alarm system has been awarded to the Bell Telephone Company, of Montreal.

MONTREAL, QUE.—The Montreal Park & Island Railway have recently let the contract for the construction of the St. Vincent de Paul branch, to be completed this Fall.

An English syndicate is considering the question of leasing the Metropolitan Street Railway. The matter of the extension of the line to Richmond Hill is understood to be a part of the deal.

The Canadian Electric Railway and Power Company is seeking for incorporation with power to build an electric railway from Cobourg to Niagara Falls, via Port Hope, Bowanville, Oshaua, Whitly, Oakville and Hamilton.

HULL, QUE.—At the first annual meeting of the Hull Electric Railway Company, held recently, arrangements were made for the building of loop line and erecting a large Summer hotel at Hull. Mr. Alexander Fraser was elected president, and Mr. H. D. Spencer, managing director.

TORONTO, ONT.—Messrs. Dewart & Reney, solicitors, have given notice that application will be made to the Dominion Parliament for an act to incorporate the Toronto Radial Railway Company, with the power to take over the franchise of the Toronto Belt Line Railway Company, and to convert the present Belt line railway into an electric road.

NEWFOUNDLAND—An electric railway is being arranged for St. John's, to be operated between the city and the suburban villages, within 20 miles, the plant to be driven by water, of which there is any quantity in the different rivers, which are numerous near the city. The promoters are hopeful of its prospects despite the snows of Winter, which are likely to interfere with its workings.

PETERBOROUGH, ONT.—Tenders are being received by S. R. Armstrong, Town Clerk, for lighting the streets of the town of Peterborough with 80 or more arc electric lights of 2,000 candle-power each, to be placed as directed by the council, through the chairman of the Fire, Water and Light Committee, and to be lighted all night. Form of contract can be had from the Town Clerk.

Montreal, July 30. J. A. C.

The Electric Light Company's Insurance Held Good.

Judge Grove, of Grand Rapids, Mich., has rendered a judgment for the plaintiff for $2,098.89 in the case of the Electric Light and Power Company, of that city, against the Fidelity and Casualty Company, of New York. The local lighting company held a policy in the Fidelity company, which indemnified it against possible loss through liability for damages because of injuries received by employés or others, by accident, or through the carelessness of employés. Last December an employé of the lighting company was trimming an arc light and dropped a piece of carbon to the ground. The carbon struck in the eye of a child who was passing, and caused the loss of the eye. When the parents of the child made a claim for damages to the lighting company they immediately notified the Fidelity and Casualty Company, and requested the latter to defend the suit. This was not complied with, and subsequently the parents of the child were given a verdict for about $2,000. The electric light company then began suit against the Fidelity and Casualty Company, with the result stated.

ADVANCE INFORMATION

Valuable News and Tips for Manufacturers and Dealers.

We publish below information relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW.

Electric Light and Power.

NORWALK, CT.—The General Electric Company will soon take possession of the Norwalk & South Norwalk Electric Light plant and run the business.

FORT FAIRFIELD, ME.—The Waterville & Fairfield Electric Light and Power Company are to make quite extensive improvements on their power plant in this village in the near future.

HYDE PARK, MASS.—Work has just commenced on the new plant of the Hyde Park Electric Light Company. The company has purchased about 40,000 feet of land, on which extensive buildings will be erected, and machinery with sufficient power will be employed to furnish the motive power for the Norfolk Suburban Electric Railroad, the West Roxbury & Roslindale Electric Road and the new Central Suburban Railroad Company, now being constructed through Dedham, Norwood and Walpole. Power will also be furnished to run about 15,000 incandescent lamps.

SCRANTON, PA.—The contract for the construction of the new electric light plant at the Hillside Home has been let to H. B. Coho & Company, of New York.

CLEVELAND, OHIO—The Century Power and Lighting Company has been incorporated by E. M. Smith, Albert Straus, Hiram Straus, A. B. Pinney, and F. Barkoske. The capital is $10,000.

ROCKVILLE, MD.—Address the Mayor concerning water supply system for the city and erection of electric light plant, for which $20,000 will be expended.

CHATTANOOGA, TENN.—The Chattanooga Electric Light and Power Company has let contract to D. J. O'Connell for the erection of its new power house. Cost $12,000.

HEMPSTEAD, TEX.—Address the Mayor concerning franchise which has been granted for electric lighting.

VAN ALSTYNE, TEX.—McKinney & Marr will increase their lights from 25 to 100 lights.

ENGLISH, IND.—An electric light company has been organized with Joseph H. Finch, president, and William L. Gregoty, vice-president and secretary. Capital stock, $5,000.

NEWPORT, TENN.—The Newport Mill Company will put in an electric light plant and desires estimates on machinery.

HONEY GROVE, TEX. — C. C. Wright, City Clerk, can give information concerning electric light plant, for which bids are being invited.

GREAT FALLS, MONT.—C. N. Atkinson is constructing an electric light plant.

NEGAUNEE, MICH.—Steps are being taken looking to the erection of an electric light plant.

WASHINGTON, D. C.—Address D. M. Bro ning, Commissioner Indian Affairs, concerning erection of electric light plant.

CONCORD, N. C.—The Concord Electric Light Company will increase the capacity of its plant. New machinery will be added, etc.

ASBURY PARK, N. J.—The Atlantic Coast Electric Company will put in a new $500,000 plant.

MARYVILLE, TENN.—The Maryville Light and Power Company will add new dynamo, and make other improvements to its electric plant.

SALEM, VA.—The Mayor may be addressed for information concerning new machinery to be added to its electric light plant.

GIBSON STATION, N. C.—J. H. McIlwinen is in the market for a 50 or 60-light dynamo.

THREE OAKS, MICH.—F. B. Hinchman, Village Clerk, can give information concerning construction of an electric light plant.

MYSTIC, CT.—J. Holmes reports that the electric light plant will not be constructed until next Spring.

HARTFORD, CT. — Alderman A. Kennedy Child may be addressed for information concerning the construction of an electric light plant.

W. BRATTLEBORO, VT.—The question of having incandescent electric light in town is being agitated.

QUINCY, ILL.—The new machinery has been ordered for the addition to the Quincy electric light plant. It includes a 450-horse-power tube boiler, two engines and more dynamos. The company will expend $20,000 on a new building, 70x24, and on the machinery.

RANDOLPH, VT.—The Bethel Electric Light and Power Company contemplates extending its lines and service to this village.

AUSTIN, TEX.—The Bosque County Telephone Company has been incorporated with a capital stock of $1,000. Purpose to build a line from Morgan to Meridian, in same county, and other points.

LACONIA, N. H.—The Citizens' Telephone Company has been incorporated with a capital of $5,000.

BANGOR, ME.—Winn Water and Power Company has been incorporated by N. M. Jones, president; J. E. Clark, treasurer; M. F. Scott, clerk, and others. Capital stock, $100,000.

New Electric Railways.

BOSTON, MASS.—The Railroad Commissioners have granted the Gardner Electric Street Railway permission to issue $50,000 stock, to defray cost of equipping road with electricity, and $30,000 six per cent 20-year bonds for funding floating debt.

BARCELONA, N. Y.—There is talk of building an electric railway from this place to Chautauqua in the near future. W. L. Minton and Hermon L. Kent, of Westfield, are interested.

HAGERSTOWN, MD.—The Hagerstown Street Railway Company, which has about concluded building its electric road between this place and Williamsport, has given a mortgage for $200,000 on all its property to the Commonwealth Guarantee Trust and Safe Deposit Company, of Harrisburg, Pa., to secure the bonds it will issue for that amount. The road will be in operation in about three weeks.

LUDINGTON, MICH.—There is a movement on foot for building an electric road from this place to Hart.

BROCKTON, MASS.—An additional issue of $104,000 capital stock of the Brockton Street Railway Company, for improvements, has been approved by the Massachusetts Railroad Committee.

MASON CITY, IOWA—Franchises have been granted to the Mason City & Clear Lake Traction Company to build electric street car lines between the two towns and through them, in all 17½ miles of track, at a cost of $200,000. The principal stockholders are W. E. Brice and L. H. Ong, of Tama, Iowa. The grading will be done this year, and they will begin operation early next season. The manager is L. B. Bradley, of Des Moines.

CHICAGO, ILL.—Stockholders of the West & South Town Street Railway Company and Chicago General Railway have formally effected a consolidation of the two corporations by unanimous vote, and will assume the name of the latter company.

BOSTON, MASS.—The Brockton, Bridgewater & Taunton Street Railway has been granted a charter to build 18-mile road from this place, through West Bridgewater and Raynham to Taunton. Capital stock, $200,000. Directors are C. C. Merritt, W. L. Douglas, I. J. Whipple, and Wm. Jones, of Brockton; Chas. A. Reed, Taunton; George J. Morse, Hyde Park, and A. B. Williams, Taunton.

CHARLESTOWN, N. H.—Ground has been broken for the electric road between this place and Springfield, Vt., and the enterprise will be completed at an early day.

LA PORTE, TEX.—Steps are being taken to form a company to build an electric road in the suburbs.

PORTLAND, ORE.—The Oregon Railway and Navigation Company has been incorporated by Henry Falling, E. McNeil and W. W. Cotton, to operate and conduct the lines of the former Oregon Railway and Navigation Company's system, etc. Capital stock, $35,000,000.

NEWARK, N. J.—Consumers' Electric Light and Power Company has been incorporated by Benjamin Atha, Albert O. Headley, Edward L. Conklin, of Newark, and Thomas C. Barr, of Orange, N. J. Capital stock, $300,000.

SAGINAW, MICH. — The Rapid Transit Electric Railway Company will build electric road. Work will be rapidly pushed.

EUREKA SPRINGS, ARK.—The electric street car system has been put in operation.

PITTSBURGH, PA. — Pittsburgh & North Side Traction Company has been incorporated, with Charles H. Steele, Steubenville, president; H. H. Smith, and others, to build electric line. Capital, $26,000.

CHICAGO, ILL.—The United States Rapid Transit Company certified to the change of its name to the Dyer Power Company.

PALMYRA, N. Y.—The Wayne Central Railroad Company is the name of the company projecting the trolley line to connect this place and Marion. The capital stock is $125,000. The principal office to be located at Rochester.

RUTLAND, VT.—The Rutland Electric Road Company expects to extend its road another year, so as to reach all the outlying districts of the city.

BRIGHTON, MASS.—The West End Street Railway Company intends erecting a car house in this place. The estimated cost is $30,000.

THOMPSONVILLE, CT.—There is a movement on foot here to extend the track of the local electric railroad to Windsor Locks and soon to Hartford. The line will run through Warehouse Point.

New Manufacturing Companies.

RED BANK, N. J.—Red Bank Foot Power and Manufacturing Company has been incorporated by Benjamin J. Parker, Charles V. Hope, and others. Capital stock, $100,000.

CHCIAGO, ILL.—Carbon Rheostat and Electrical Manufacturing Company has been incorporated; capital stock, $10,000; to manufacture electrical apparatus; incorporators, Sydney Stein, Henry R. Platt and Frank Crowe.

DES MOINES, IOWA—Articles of incorporation of the Western Engineering and Construction Company have been filed for record with the County Recorder. The officers and incorporators are: L. B. Bradley, president; W. E. Brice, vice-president; L. H. Ong, secretary. Capital stock, $25,000. It is empowered to engage in engineering work of all kinds, and more especially in construction.

CAMDEN, N. J.—The Globe Electric Heating Company has been incorporated.

Increase of Capital.

HYDE PARK, MASS.—The Hyde Park Electric Light Company has increased its capital stock $50,000.

NEW YORK, N. Y.—Third Avenue Railroad Company proposes to increase its capital stock $3,000,000.

KINDRED INTERESTS

The Sterling Supply and Manufacturing Company, of 97 Bank street, New York, recently sold a fine order of 250 registers to a street railway company in Mexico.

The Electric Storage Battery Company, of Philadelphia, has removed its Boston office from the Exchange Building to more commodious quarters in the Farlow Building, 92 State street.

The Boston office of the Electric Storage Battery Company, of Philadelphia, has been removed to 92 State street. Mr. Arthur E. Childs is the New England manager for this company, and found that additional room and more commodious quarters were necessary to carry on the increasing business in this territory.

The Metropolitan Register Company, 88 Bank street, New York, is meeting with a magnificent business in the sale of its registers. The Metropolitan register shows the sale in the correct commercial form, with bold figures so plain that any child can read it. There is no better register made, and the public are fast finding this out.

The reputation of the Electra carbon, for brilliancy, length of life and freedom from dust, is well known wherever the carbon has been used. The Electric Appliance Company, of Chicago, as general western agents, are prepared to give full particulars regarding these features of the Electra carbon, and to supply them from Chicago stock at manufacturers' prices.

The adoption of the storage battery in central station practice, in this country, seems to be an assured fact. Within the past few weeks the Electric Storage Battery Company, of Philadelphia, has contracted to install batteries of chloride accumulators in the stations of the Boston Edison Company, their third plant; the New York Edison Company, their second plant; the Brooklyn Edison Company; the Easton, Pa., Edison Company; the Hartford Electric Light Company, the largest battery in the world; the Claremont, N. H., Electric Company; the Woonsocket, R. I., Electric Machine and Power Company, etc. The company has also recently closed contracts with the government for batteries for the New York Custom House, West Point Military Academy, Ford's Theatre, Washington, D. C., which is a government building, and the Brooklyn Navy Yard. Installations of chloride accumulators are now being put down in the Germantown, Pa., Hospital; College of Physicians and Surgeons, New York; for lighting the Sloane Maternity Hospital; St. Paul's M. E. Church, New York, and in the residences of Mr. Henry Villard and Mr. J. J. McComb, Dobb's Ferry, N. Y.

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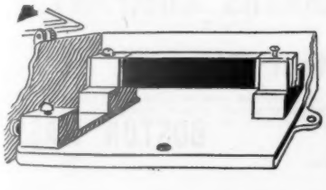

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ELECTRICAL PATENTS

ISSUED JULY 21, 1896.

564,195 Electric car brake; J. C. Henry, Colorado Springs, Colo.—Comprises a direct-current dynamo on each car, a magnetic clutch in series therewith, and brake gearing operated by said clutch, the dynamos on the several cars being connected together in parallel.

564,196 Telephone; E. A. Hinckley, Owego, N. Y.

564,200 Alternating-current dynamo; M. Hutin, Paris, France.

564,229 Automatic fire-alarm system; E. A. Speer, Toledo, Ohio—Comprises a circuit containing a relay and battery and controled by a two-point thermostat, a second circuit controling an alarm, a battery in said second circuit and means controled by the second point of the thermostat for throwing the batteries into combined action for sending the fire-alarm.

564,258 Electric massage apparatus; G. Rossback, Lichtenfels, Germany—Composed of a casing having on the back, a screw threaded sleeve, adapted to receive a rod for massaging the back of the human body.

564,262 Electrical transportation system; P. K. Sterns, St. Louis, Mo.—A truck, an armature mounted on the axle thereof, but rotating at an angle to said axle, and means for driving said axle in either direction from the armature.

564,296 Magnetic chuck; O. S. Walker, Worcester, Mass.

564,314 Annunciator; J. B. Rogers, Zilah, Wash.

564,328 Telephone exchange system; W. F. Dean, St. Louis, Mo.

564,331 Electric metal-working apparatus; H. Lemp, Lynn, Mass.—A flexible transformer—secondary, composed of pieces or strips of conducting material and having a single turn or bend, with two work holders opposed to one another and fixed rigidly to each piece of the secondary.

564,333 Means for generating electricity from car-wheel axles; M. Moskowitz, Newark, N. J.—A dynamo mounted on a frame, which is pivoted on a horizontal axis to a car-wheel truck of a railway car, a friction gear on the armature shaft of the dynamo, a friction gear on the car-wheel axle, and means connected with said dynamo for causing a sliding movement of the same, and maintaining the constant frictional engagement of said friction gears.

564,334, 564,335, 564,336 Means for generating electricity from car wheel; M. Moskowitz, Newark, N. J.

564,344 Electric signal apparatus for elevators; S. C. Stickle, New York.

564,369 Elevated electric railway; E. W. Farnham, La Grange, Ill.

564,371 Voice conveyor for telephones; C. M. Fleury, Brooklyn, N. Y.—Has a rigid, tubular body provided with transversely arranged ribs on its inner surface and a mouth piece, and having an aperture, or apertures, in its lateral walls for the escape of the breath, said aperture, or apertures, being covered with fine gauze to prevent the escape of sounds.

564,395 Electric car trolley; W. H. Russel, Newcastle, Canada.

564,437 Electric blasting machine; J. Macbeth, Brooklyn, N. Y.—A propeling screw, and a tubular shaft provided with an internal collar, rollers carried by the spindle of the screw for engaging the internal collar.

564,455 Electric motor; G. J. Scott, Philadelphia, Pa.

564,456 Operators' keyboard apparatus and circuit therefor; C. E. Scribner, Chicago, Ill.—A centrally pivoted rocking lever, a button pressing upon each end thereof, and a wedge or block carried by the lever adapted to move between switch springs to alter their contacts with anvils provided for them.

564,457 Operators' keyboard apparatus and circuit therefor; C. E. Scribner, Chicago, Ill.

564,458 Keyboard apparatus for telephone switchboards; C. E. Scribner, Chicago, Ill.

564,480 Electric elevator; G. T. Francis, Chicago, Ill.—A hoisting cable for the car and a traveling locomotive arranged to take up and pay out said cable, whereby the car is raised or lowered.

564,485 Electric mat; O. H. Hicks, Chicago, Ill.—Contact terminals provided in pairs with their members normally disconnected, spring circuit closers bridging the pairs of contacts and normally out of contact therewith, and the conducting wires passed in zig-zag manner about members of the pairs of contacts in adjacent rows thereof.

564,558 Speed regulator for electric motors; R. Eickemeyer, Yonkers, N. Y.—An electric motor, a separate electric generator, driven by the motor, governing field coils in the motor, adjacent to its true field coils, and supplied with a current from said generator, which induces from the governing coils magnetism opposite to that of the true field coils, and a field-exciting coil in said generator in series with the main field coil of the motor.

564,559 Dynamo electric machine; R. Eickemeyer, Yonkers, N. Y.

564,567 Thermostat; Hosea F. Maxim, Norfolk, Va.

The White-Crosby Company.

One of the most reliable and successful firms of contracting electrical engineers in the country is the White-Crosby Company, 29 Broadway, New York city. They have carried out some very important installations with success and are now building the electric transmission line which will carry Niagara Falls power to Buffalo. The following is a list of the work the company has had in hand since February 1, 1896:

About 10 miles of track and overhead construction for the Norwalk, Ct., Tramway Company, five of which are completed and in operation. The balance of the line is being finished up as rapidly as possible.

Six miles of complete line for the Rahway & Sewaren, N. J., Electric Railway, which is about completed, and will soon be in operation.

Five miles of overhead, including 15 miles of feeder for the Bergen County, N. J., Traction Company. This line is completed and in operation.

Contract with the Baltimore City Passenger Railway Company for special work and overhead construction, connecting one of their cable tracks with an electric line.

Five miles of overhead for the Baltimore Traction Company on their new Westport line.

Five miles of extra feed wire for the Baltimore Traction Company, to give them sufficient power for their base-ball business.

Equipping the Druid Hill Avenue cable line of the Baltimore Traction Company for electric service—about eight miles.

Two thousand feet of subway for the Baltimore & Ohio Railroad Company, to enable them to light their new Mt. Royal station from their present power house, which operates the Belt Line tunnel electrically.

Equipping the overhead extension of the Gwynn-Oak line of the Baltimore Traction Company, also building and equipping the smallest electric railway in the country, which connects with the Walbrook extension of the Baltimore Traction Company. This road is only about 3,000 feet long and is complete within itself.

The White-Crosby Company are the electrical engineers for the Helena & Livingston Smelting and Reduction Company's new plant. This is a power transmission plant, including two 225-kilowatt and five 150-kilowatt Crocker-Wheeler 500-volt machines, the distance of transmission being one and one-half mile.

They are the electrical engineers for the Helena Water and Electric Power Company, which is installing Westinghouse alternating apparatus, to transmit power to East Helena and Helena, Mont., 12 and 17 miles, respectively. The station is planned for eight 650-kilowatt generators (four of which are now being installed), step-up transformers, step-down transformers and the necessary station apparatus. The voltage will be about 10,000 on the transmission line, distributing through Helena and East Helena at required voltages.

They have completed about five miles of the Atlantic Highlands, Red Bank & Long Branch, N. J., electric railway, and will finish the line by Fall.

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REFERENCES: "Electrical Review," New York; Paul Cromlein, Teller Lincoln National Bank, Washington, D. C.; Judge Geo. D. Parker, Berkley, Va.; Second National Bank, Washington, D. C.; E. K. Leech, U. S. Mint, Philadelphia, Pa.; W. F. Newell, Manager and Secretary Water Works, Olympia, Oregon.

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The Pacific Electric Company, La Crosse, Wis., are the manufacturers of the Espersen electric water heater and the Espersen revolving shade for desk lights.

The Syracuse Storage Battery Company, Herald Building, Syracuse, N. Y., issue a handsome catalogue descriptive of their storage batteries for various services.

X Rays—The L. E. Knott apparatus Company, 14 Ashburton place, Boston, Mass., have prepared an interesting, illustrated pamphlet describing apparatus and methods for the practical use of X rays. It will be sent free on request.

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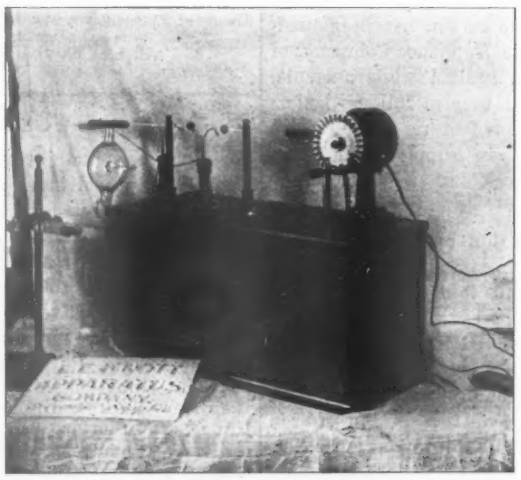

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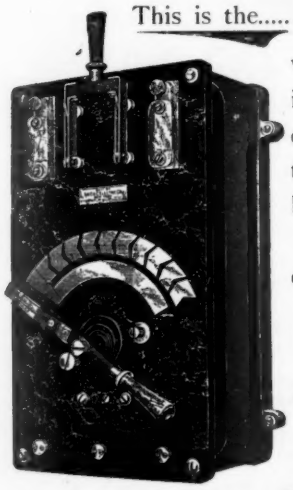

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